

COMPARATIVE ADVANTAGES OF CARTS AND WAGGONS.

A waggon is a four-wheeled vehicle employed in carrying articles of heavy weight and large bulk from one place to another, and is drawn by two or four horses, according as the weight of the carriage, the loads that are drawn, the distance, and the state of the roads may require. The four-horse carriage with broad wheels, and of very strong construction, is chiefly used for long journeys and loads of heavy articles, which require to be only once placed on the vehicle, and no shifting or reloading is necessary. The body of the waggon is closely boarded, in order to contain coals and lime; and grains and flour for the market are loaded in sacks. This waggon is mainly used by coal merchants and millers, and on extensive farms the thrashed grains are carried to distant markets in the four-horse vehicles. Coals and lime are also fetched from distant places in heavy loads in the strong carriages, drawn by a team of horses.

For the lighter purposes of carrying the crops of grain and hay from the fields to the rick yard a pair-horse waggon is used, which is built with open sides and boarded bottom, and drawn by two horses in tandem, or abreast, as in the four-horse carriage. The lightness of the vehicle permits a quick movement in the operations; and the use is very convenient in hay and corn harvests, when the waggon is open-built, and not encumbered with unnecessary weight of materials. Grain is carried to market in sacks very conveniently in this waggon, which in other cases is closely boarded in the sides, and becomes useful for the same purposes as the four-horse waggon, and only in the reduced ratio of two or three horses to four or five. This is the waggon of the farmer, and carries abroad and brings home all transportable articles, which are arranged in loads as circumstances may direct.

A cart is placed on two wheels in the centre of the body of the vehicle, from which two shafts extend in front, and form a connection of draught by which two horses yoked in tandem pull forwards the carriage or vehicle. The load is balanced on the wheels and on the back of the horse, which walks between the shafts, and is rendered steady by the imposition of part of the weight. The box of the cart is locked to the shafts; and being made to unlock, and the tail-board being moveable, the carriage is raised aback, and the load is discharged. This vehicle carries home and abroad loads of every kind of articles, and, being provided with projecting frames of timber spars, the crops of hay and grain are carried upon it from the fields to the rick-yard. For the purpose of distant journeys the lock is removed, the shafts being firmly joined with the body of the cart, which prevents the joggling motion, from the lock being present, that arises from the loose connection of the shafts and the cart. This provision is convenient for long journeys. The one-horse cart is contrived as the two-horse vehicle, the dimensions being reduced in strength and extent in order to suit the power of one animal. The axles of carts are mostly of iron, though wood is yet used in many cases of home use.

The four-horse waggon is a useful implement on farms that are beyond the medium extent, for the purpose of carrying lime and coals, and the thrashed grain to the market. Two waggons may be placed on large farms; and being not very heavily constructed, two horses are able to draw the loads of hay and grain during harvest. On uneven grounds in hilly

tries, and from distant fields, four wheels are more secure

in the travelling, and more safe from being upset with top-loads, than any carriage with two wheels; and in these cases the advantage is very apparent. But the movements are slower; much time is spent in placing and discharging the loads, which must be inconveniently large, in order to compensate the more frequent repetition of less bulky quantities. The chief use of the four-horse waggon is not for home work, but in going abroad with heavy and bulky loads of one lading in a day, or in not more than twice sent on a journey; and a convenience is found in descending steep declivities from locking the wheel, and easing the horses from the impelling weight pushing behind them. This exemption is not large in amount, as the occurrence of very steep roads is partial, and does not form a decision of preference in the implement.

The pair-horse waggon possesses a much wider range of utility than the carriage that is drawn by four horses, and the adaptation is much more convenient for the purposes of the farm. Being lightly made and neatly joined together in the component parts, the implement is managed by two horses, and one man to drive the carriage, which is a more convenient arrangement than two persons attending one waggon, as with the four-horse vehicle. The hay and corn harvests are very conveniently carried by this waggon in such loads as the distance and the condition of the roads will admit; and the implement is built with open sides, of spars, with a projecting frame. For the purpose of carrying coals and lime, and similar substances, the sides are temporarily boarded; and all articles in sacks, as thrashed grain, are carried in the open waggon of spars and light frame. This is the true harvest carriage, being lightly and neatly made, and suited to the special purpose. The boarded vehicle drawn by two or four horses is not so convenient, though it is applied to both light and heavy purposes.

The long-shaped harvest-cart of Northumberland and the south of Scotland is placed on two wheels, drawn by two horses yoked in tandem, with a boarded bottom and open sides of spars, with a projecting frame. The implement performs exactly the same purposes as the light two-horse waggon, and is fitted on the wheels of the box-carts of the farm. It would be difficult to draw, even from an extensive and varied experience of both carriages, a fair comparison between these implements. Both vehicles are drawn by two horses, and managed by one attendant, and in that respect are precisely equal: and equal loads of any articles are carried on both vehicles on steep grounds, and in crossing declivities with deep and wide furrows. Top-loads of bulky articles, as hay and grain crops, are more safely carried on four wheels, which are not so readily upset as the two-wheeled carriage. On the other hand, the long cart is more nimble in the motion, and quicker in being turned, than the waggon, which occupies more room in the rick-yard, when crowded, in harvest. The waggon may be boarded in the sides, to carry coals and lime. The cart is not contrived for that use; but being provided with two wheels, and these borrowed for use from the box-carts of the farm, the original cost being less than the four wheels of the waggon, may determine the comparison in favour of the cart, but which may be balanced by the other advantages of the light waggon. Both implements form the highest use, and are equally preferred.

The two-horse cart is used for heavy and distant carriages,

and for performing the detail work of the farm. Greater weights are drawn by two horses in these carts than in the four-horse waggons, and a very large superiority for small works, in which waggons are wholly useless. Being provided with sparry frames, the carts convey from the fields to the rick-yard the hay and grain crops, though not very conveniently, from danger of oversetting the top-load that is placed over a light box beneath, except on comparatively level grounds, and not very distant carriages. In these situations, the pair-horse waggons and the long harvest-cart are both dispensed with; and the two-horse box-cart, with iron axle and strongly-shod wheels, performs every work of the farm, with the distant journeys and carriages. But in most cases, the long cart and pair-horse wagon are introduced for harvest performances.

The single-horse cart has been contrived for detail work, in which frequent and quick repetitions are required of the operations that are performed. For every kind of summer work, when the ground is dry and firm, in dunging turnip lands, laying lime and dung on wheat fallows, carrying earths and stones, and all detail work of the farm, the cart drawn by one horse is immeasurably superior to any other vehicle, as it carries loads of dung for an acre of turnip land very sufficient in twenty outgoings from the heap, and a cubic yard of earth and stones is drawn to moderate distances without oppression to the horse. The lightness of the carriage permits quick and easy travelling, to which the narrow wheels offer little resistance. The load is readily discharged in one heap, or distributed into several portions, by the freedom of construction in the tail-board and forelock, which raises the cart into a slanting position, to facilitate the discharge of the load. On all turnip farms, the use of this cart is indispensable; and even for distant journeys, in fetching coals and lime, and in carrying thrashed grain to the market, the single-horse cart is superior to any other vehicle in carrying greater weights of load, and with more ease to the horse. A single animal will draw a ton on moderately steep roads, and for any length of journey; thirty hundred-weight, and even two tons, are drawn by carriers' horses and at collieries and iron works. But one ton may be assumed as an average weight of load in farming operations. On level grounds of conveniently arranged farms of two hundred and three hundred acres in extent, where the journeys are short and the roads not steep, the hay and corn harvests are very quickly and conveniently carried on the one-horse carts, provided with frames of timber spars, that project before and behind the cart, and over the top of the wheels. The small loads carried are most amply compensated by the quick journeys that are made in frequency, and from the ease and despatch with which the loads are placed and discharged. In these situations, of which many are found, no other vehicles are required beyond the one-horse cart, as it performs every kind of work, preventing the necessity of providing implements that only execute one purpose. The long harvest-cart or pair-horse wagon, along with single-horse carts, will provide any farm with wheeled vehicles, but liable to the objection of different implements being kept for separate purposes, when a provision is known and used by which one implement, with an occasional change, is capable of performing all the carriage-work of the farm. The cheapest and most convenient provision of carriages for any farm will be in box-carts, made in the strength and weight of materials to be used by two horses, for carrying coals and lime in distant journeys, as likewise for the detail work of the farm during winter and in all heavy weathers, and the rather small size, and the construction light as possible, allowing the use by one horse during the turnip season, and all detail work when the ground is firm and the land dry. The wheels of

these carts are fitted on the long carts of Northumberland, for the purposes of harvest; thus executing two performances with one expense of wheels. This is true economy; and rises superior to keeping four wheels of the pair-horse wagon solely for the purposes of the employment of the single vehicle. The sole advantage of the harvest wagon over the long sparry cart, in the top loads not being so easily overset, is wholly sunk in the superiority now stated; and waggons are exposed to the objection of the hind wheels being distant from the horses, and carrying a weight removed beyond the power of the animal. The box-cart may be merged into a vehicle for two horses during winter, and for distant journeys, and for one horse in all summer work, by the construction being neat and strong, materials light and durable, and the size resembling more the single-horse cart than the lumbering carriages commonly seen attached to two horses. A medium size and construction must be adopted. These carts require horses of spirit and muscular strength—tall, active, and powerful. The dull, sluggish animals of the wagon are not fitted for purposes in which only one or two horses make the exertion.

The wagon is a vehicle of slow progression, arising from the length of the construction of the implement, and from the hind wheels being placed at a considerable distance from the moving-power that is attached to the front part of the carriage. Hence the general handling of the implement is awkward and inconvenient in the turnings, and in all lateral directions. The irremovable attachment of slowness is gradually, and by habit, communicated to the animals of draught, and a pace is acquired in conformity with the jogging motion of the heavy length of the wagon. The drivers acquire the same habit, and gradually sink into the pace that the motive-powers have adopted, as being the least troublesome, and the most convenient and suitable. From these causes it is seen that in the countries in which the use of waggons prevails, and the grain is thrashed by the slow process of a man wielding a flail, the farm labourers are slow and more awkward in every kind of work than where carts are used as farm vehicles, and where grain is thrashed by machinery. A quickness is compelled to attend on the evolutions of machinery, and the habit is transferred to all other performances. A latent barbarism of the mind continues the use of these slow powers of action long after the inferiority has been discovered and acknowledged; so slowly are prejudices removed.

The purposes of use have been mentioned for which the different carriages of the farm are respectively fitted, and the superiority has been stated in the points of utility where one vehicle is seen to exceed another in the general as well as in the single occupations. The four-horse wagon is adapted only for some special purposes: in carrying top-loads on the farm, and in transporting heavy articles in distant journeys. These occasions are comparatively few, and do not justify the heavy cost of the implement remaining idle during the greater part of the year, as no part of the wagon is applied to any other use. The pair-horse wagon is more adapted for farm purposes, as has been mentioned; but still objected to as an expense dormant in one purpose of use, as the implement is wanting in any other adaptation. And for any detail work waggons are wholly useless. The two-horse cart adapts for any purpose of farm; and has only one inferiority, in being not so steady as waggons under top-loads, and more liable to be overset. The cart drawn by one horse is by far the most useful for detail work of every kind, but, though used, may fail for harvest purposes, and require the conjunction with a harvest cart. This last implement being fitted on the wheels of the box-carts, supply the inconvenience and complete the arrangement.

The prime cost of the different implements must have a large consideration in determining the preference of one vehicle over another, along with the liability of getting into disrepair, and the comparative expense of making the condition effective. A four-horse waggon equals the cost of more than two carts drawn by two horses; and as the number of animals employed are equal in both arrangements, the superiority of the two carts in a variety of purposes requires no argument or demonstration. Nearly four one-horse carts can be purchased for the price of a waggon. And here, again, the greater value need not be argued of four vehicles acting separately in varied purposes. The same difference is found in carts and the pair-horse waggon, only somewhat reduced by the price of a lighter waggon. The harvest cart of Scotland will cost not above the

one-half of the price of a pair-horse waggon; and when the cart is fitted on the axles of the box-carts, the cost will not exceed one-fourth of the latter vehicle. The differences are most important in the case of a just comparison of the implements; and being joined with the superior usefulness of carts for general and varied purposes, there is formed an incontestable reason of preference of the cart as a vehicle of the farm. The best and most extensive farming in Britain is performed, and all farming may be conducted, by carts, without any waggons; but no cultivation of land is done, or ever will be executed, with waggons without any carts. The latter observations may settle the comparison of the two kinds of carriage implements in the value of practical utility.

ON MANGOLD WURZEL.

The mangold wurzel plant requires for its successful growth a soil of clayey loam of the best quality, that is deep and warm, both friable and tenacious. Dry lands of all kinds are not proper for the cultivation of the plant, and shallow soils are equally adverse, whether the subsoil be wet and impervious, or a hard concreted mass of heterogeneous debris. The top root of the plant requires a depth of natural formation, and a large alluvial mixture. A moist climate is also necessary for the growth of mangold wurzel, humid, and with much warmth. It is useless to attempt the cultivation of the plant unless these circumstances are present, at least in some quantity, and in a moderate degree. At the same time, many fair crops are produced under circumstances that do not comply in a large extent with these necessary provisions.

The stubble lands intended to be planted with mangold wurzel are ploughed in the early winter with the strength of three or four horses, in a furrow of seven or eight inches deep, and of proportionate width. A depth is essential, in order to afford a quantity of earth for the workings of the land, by the processes of cultivation. All lands may be best ploughed in the winter; furrow by the strength of three or four horses. Green crop lands that are prepared for early crops, as mangold wurzel, will derive much benefit from a deep furrow of earth. So soon in the spring as dry weather and the proper convenience of the farm allow the work to be done, the land is ploughed across with deep furrows, in order to reach the bottom of the winter ploughing; and in a narrow width to cut the land into thin slices, which will facilitate the future reduction of the soil. A heavy and severe harrowing follows the cross ploughing, and then a rolling with a cast-iron implement of a ton in weight, after which a second harrowing raises weeds and stones into view, which are picked by hand, and removed from the field. Within ten to fourteen days after this process, the land is ploughed lengthwise with deep and narrow furrows, harrowed, rolled, and harrowed as before, and the weeds and stones removed. In many cases the land will be prepared by these workings to be drilled and dunged. If the weather has been unfavourable for pulverising and cleaning the soil, and if the quality of the land exceed a medium stiffness, another earth must be given, as has been mentioned, in ploughing, rolling, and two harrowings, and a picking of weeds and stones. When lime is applied, it is spread evenly over the surface of the last earth, and harrowed into the fine tilth, when the drillings of the land mingle the lime with the soil in a very efficient manner. In order that the quick lime may beneficially increase the temperature of the soil, the dose must be liberal

not under 200 bushels to an acre, and applied in the hottest possible condition immediately on being reduced to powder by the application of water. In this condition, the inherent caloric of the lime imparts the most warmth to the ground.

The land being now ready, clean and level, the common plough draws a heavy furrow and as deep as possible, in the direction in which the drills are wished to lie, and returns in the same furrow, throwing the earth to the opposite side, which opens a deep drill with open sides. The horses walk one on each side of the first-drawn furrow, with a main-tree of five feet in length, to allow the animals to walk widely apart. The left-hand horse now walks in the open furrow, and the right-hand animal on the level ground, while the plough is directed along the side of the comb of the last furrow, at the distance of 30 inches, and makes a new drill. The plough must move deeply and widely with the utmost strength of horses, and time allowed. In this way the plough travels down one side of the first-made trench, and returns along the other, making a drill in each journey; and when the work becomes wide, a new drill is drawn as before, parallel to the first, and the drilling continued till the field is finished.

The farm-yard dung has been carried from the cattle yards during winter, and laid in a heap in a corner of the field, or in the lane outside the gateway, and trampled beyond fermentation by the carts passing over it in depositing their contents. About two weeks before the use is required, the heap is turned over by hand forks, the lumps being carefully broken, the outside of the heap thrown into the inside, and the whole mass placed very loosely together. The component materials have been all duly moistened in the cattle-yards, well mixed together, and no dry materials allowed to be placed in the heap except in very small quantities, and then very thinly spread over the surface, and placed among wet substances. When the heap is turned over, a very active fermentation will happen by the admission of air, and the process will be in a vigorous stage, when the dung is carried into the drills of land to be planted with the mangold wurzel.

The quantity to an acre must not be under 20 loads of one-horse cart, or more nearly 25 loads, in order to ensure a good crop, as the plant requires very good encouragement, both in the quality of the land and in the quantity and quality of the dung. The heaps in the drills are spread by hand-forks evenly along the hollows, when the drills are split and reversed to cover the dung. The right-hand horse walks in a furrow, and the left-hand horse on the top of the second drill from the other horse, while the plough splits or moves three-parts of the

intersecting drill to the right hand, and lays the earth over the dung. The plough returns in a furrow, and lays the earth over a drill from the opposite side of the first covering, the horses walking in furrows two drills apart, with main-trees five feet in length, to allow that distance between the animals. The dung is now deeply covered by a drill of loose moist earth, in which the seeds of mangold wursel are deposited by hand-dibble in holes six inches apart, with two seeds in each hole, in order to gain a certainty of a young plant from each hole. The seeds are sown in a continuous stream, by drill machines provided with barrels and cups for large seeds; but experience has given the preference to dibbling, as giving a more even braird, and a better shape of drill for the growth of the plant. No advantage worth the labour attends the steeping of seeds in the various substances that have been mentioned. The mixing by hand rubbing with quick lime, after being steeped in water, prepares the seeds to be easily parted for sowing; but beyond that convenience no benefit has accrued. After the seeds are deposited, the drills are rolled by the second weight-roll of the farm in about 6 cwt., which levels the tops, and renders firm the ridges for the use of the plant. The quantity of seed is about 4 lbs. an acre, and the season of sowing from 30th April to 10th May. Early crops are the best; and the experience of the writer has not found much damage from seeding from the early crops of the first week in April; but only early climates allow this season of sowing mangold wursel.

When weeds have risen over the ground, and the plants of mangold wursel have obtained a size and strength to endure exposure and movements of the soil, and to show that all seeds have produced plants, and no more may be expected, the horse-hoe must begin its work by ploughing the hollows or intervals of the drills. A miniature plough, drawn by one horse, which goes and returns in one hollow, lays a furrow from each side of a drill, and performs the work in the most superior manner, as the narrow point of the common share takes a better hold of stiff-bottomed lands than any other scuffler yet devised. The miniature plough requires double time of the scuffler, which moves only once in the interval; but true economy ever consists in having things well done, whatever the nature or kind may be. The ploughing of the intervals of the drills must be deeply done, and near to the growing plants, as not to tear away the dung from the bottom of the drill. The interval may then be worked by the scuffler, which is constructed with a front two-winged sheave, and two posterior knives, which move the soil and cut the weeds. These scufflings are used to kill the growth of all weeds, and to pulverise the soil in the hollows, from which arises much of the benefit derived from green crops. A second ploughing by the miniature plough will be required in August, and the light scuffling continued. Two miniature ploughs joined by diagonal cross bars over the beams of each implement placed a part in the distance of a drill, and provided with two handles, as a common plough, constitutes by far the best drill scarifier yet devised, after all the ingenuity expended on that part of agricultural implements. Two horses walking one-drill apart draw the implement which bestrides a drill, and lays a furrow from each side of it, while the narrow-pointed shares pierce the ground in a way much superior to any scarifier yet known. And this depth is more necessary on the stiff lands that produce mangold wursel than on the light soils of the turnip description. But on any lands the point of superiority is found.

When the drills are ploughed in the intervals, the hand hoe is employed to cut all weeds on the top of the ridglets, and to leave the young plants of mangold wursel in single stems, at

the distance of twelve to eighteen inches. The plants must stand upright, or nearly so, and not bare of earth in the roots, and under stem. The soil lies loosely around the plants and over the drills, and all weeds are cut and pushed into the intervals, whence the life is killed by the scuffings of the implement for that purpose. The second hand-hoeing is done as the growth of weeds and hardness of the soil in the drills is seen to require. It moves and partially digs the soil, and cuts the weeds that have arisen. If any tall weeds subsequently arise, the stems are pulled by the hand by persons walking along the drills, as the scuffings and hoeings have ceased after the leaves of the plants cover the drills, and shade the intervals. In this state the crop grows to maturity.

The general ripeness of the mangold wursel plants happens in the month of October, and is evidenced by the full grown appearance of the roots, and the decay of the outer leaves. The outermost foliage is pulled by hand so soon as decay commences, and given as food to young cattle in the pasture fields or to swine in the store yard: no decay is allowed to remain on the plants, and to contaminate the inner foliage; it must be pulled and removed. In dry weather the roots are pulled by hand, and shaken clear from earth, the top root cut off by sickle at the junction with the stem, the top of leaves is severed from the plant at the insertion of the neck, and the roots and tops are placed in separate heaps or in different rows, allowing room for a cart to pass along between them. An interval of some days will make dry the earth that adheres to the roots, and it will fall away by the throwing into the carts, which convey the roots to prepared bottoms in the field, a waste corner of ground, or in the rick-yard, on which, being about six feet wide, the roots are built into longitudinal piles to the central height of four feet, and tapered to a narrow ridge. The roots are built snugly in the pile, with the thick end outwards, and tapering regularly in the sides to the top. A covering of thatch-straw is laid over the pile, and covered with one to two feet of earth, which is again covered with loose straw, or with stable-dung, to protect it from the severe frosts of winter. The pile is opened at one end as the roots are used, and closed with straw for protection. The leaves of the crop of mangold wursel are carried from the field as required, and supplied as food to young cattle in the yards and pasture fields, and to store swine. Any remnants on the field are gathered by sheep, and the ground is made clean for being sown with wheat.

Mangold wursel produces the largest weight of crop of any cultivated plant, and the value claims a high place among the useful articles of food for animals. An average crop may be stated at 25 to 30 tons on an acre, and the general produce ranges from 20 to 40 tons, and even 45 tons have been recorded. From a lengthened cultivation, and a gradually-extended exposure, the plant may become acclimated, and withstand the severity of winter as well as turnips. This result might be tried by planting the roots of the strongest and most vigorous appearance, and by preserving the seed for future propagation of these plants that escaped destruction during winter, and have seed the next summer. By persevering in this way for a period of years it is very probable that the enduring quality might be conferred, and very much increase the value of the root.

Mangold wursel contains 150 parts of nutritive matter in 1000, and is inferior to potatoes in the ratio of 150 to 200; it is superior to turnips and carrots, and inferior to cabbages. An acre of 25 tons of roots and leaves will yield 3,120 lbs. of nutritive matter; and 1,000 lbs. of the roots contain 16½ lbs. of the same substance. Rinhof states that 18 tons of mangold wursel are equal to 15 tons of ruta bage, or 7 tons of pota-

toes, or $3\frac{1}{2}$ tons of good meadow hay, each quantity containing the same nourishment; but the quantity of roots can be grown on less than an acre, and it will require two to three acres of meadow land to produce the equivalent quantity of hay, and of all the root crops the least exhausting for the land is mangold wursel.

Composition of three varieties of mangold wursel in their natural state:—

	Long red.	Short red.	Orange globe.
Water	85.18 ...	84.68 ...	86.52
Gum	0.67 ...	0.50 ...	0.18
Sugar	9.79 ...	11.96 ...	10.24
Canein	0.89 ...	0.26 ...	0.33
Albumen	0.09 ...	0.18 ...	0.03
Fibre, pectin, and pectin acid.	3.08 ...	3.31 ...	2.45
	99.20	100.89	99.70

FLESH-FORMING PROPERTIES.

Wet state.....	1.60 ...	2.12 ...	1.94
Dry state.....	10.70 ...	13.88 ...	14.40

According to some authorities one ton of mangold wursel remove the following quantities of mineral matter from the soil:—

	Mean of 3 specimens of bulb.	Mean of 3 specimens of leaf.
Potash	4.99 ...	7.86
Soda	3.02 ...	2.52
Lime	0.41 ...	3.31
Magnesia	0.43 ...	3.27
Oxide of iron	0.12 ...	0.52
Phosphoric acid.....	0.66 ...	1.94
Sulphuric acid.....	0.65 ...	2.20
Chloride of sodium.....	5.29 ...	12.82
Silica	0.54 ...	0.76
	16.11	35.20

Hence it is suggested—

1st. That the culture of this crop on sandy poor soils, which generally contain mere traces of soluble alkaline salts, cannot be successfully practised; but that a good dry loam, or a calcareous or sandy clay soil, will be best adapted for raising good crops of mangold wursel, because these kinds of soils are richer in soluble salts of potash and soda than any other descriptions of lands.

2nd. That the application of wood ashes, burnt clay, liquid manure, green manures, and other fertilisers rich in soluble potash, will improve the condition, and raise the quantity of a crop of mangold wursel; because this crop does require potash in large quantities for the perfection of both leaves and bulbs.

3rd. That the addition of chloride of sodium or common salt to the manure for mangold wursel is likely to be attended with beneficial results.

Experiments are recorded to have proved the relative value of mangold wursel and Swedish turnips, that 3 lbs. of the former are equal to 4 lbs. of the latter; one acre of 30 tons of mangold wursel would yield 347 stones of beef, at 6s. 6d. = £11 4s. 3d.; that one acre of 20 tons of swedes would yield but 17½ stones, at 6s. 6d. = £5 13s. 9d.—difference £5 10s. 6d. And the opinion is generally entertained, that 30 tons of mangold wursel are as easily obtained from an acre as 20 tons of swedes. Mangold wursel contains 11.766 of solid matter; swedes 9.489.

It was early observed that mangold wursel was a plant of a very saccharine matter, and that crystallisable sugar was to be obtained from the roots of the plant. The manufacture of beetroot sugar sprung up in France, under the superintendence of Chaptal, the eminent chemist, in consequence of the pro-

hibition of British colonial produce. When the sugar is refined it cannot be distinguished from the cane sugar either in taste or appearance. Five tons of clean roots produce about 47 cwt. of coarse sugar, which yield about 160 lbs. of double refined sugar, and 60 lbs. of inferior lump sugar; the rest is molasses, from which a good spirit is distilled. By distilling the juice of mangold wursel, after it has undergone the vinous fermentation, a very good spirit is obtained, and also a kind of beer, which is said to be pleasant and wholesome in warm weather.

Professor Lampadino obtained from 110 lbs. of roots, 4 lbs. of well grained white powder sugar, and the residuum afforded seven pints of spirit. Achard says, that about one ton of roots produced about 100 lbs. of raw sugar, which gave 55 lbs. of refined sugar and 25 lbs. of treacle. This result is not very different from that of Chaptal, in France.

Mangold wursel grows in long roots, standing upright, reddish in colour, or whitish red skin, the inside veined with red, in concentric circles. A variety is yellow in colour; and another kind is the orange beet, and globe or turnip-rooted. White colours are found to yield most sugar; the long yellow contains the greatest quantity of nutritive matter; but the long red variety produces the largest crop, of which the upright tapering plants, standing from 12 to 18 inches above the ground, with one root projecting downwards, are always found to be the soundest, the most palatable, and the most nutritious.

The roots of mangold wursel, either in a raw or steamed state, are very beneficially given to milch cows throughout the winter, and are found to increase the quantity of milk very much; but the milk is thought to be very thin and watery in quality. In a raw state there is no better food for store pigs and young cattle. In the fattening of cattle, opinions differ as to the value of mangold wursel, when compared with Swedish turnips. The most general opinion prefers the latter; and the experiments made by feeding animals of equal age and the same breed, on the two different roots, have proved altogether inconclusive, because no two animals, of any age or breed, can be found to increase in equal weight in the same time from a given quantity of the same food. Mangold wursel is equally grateful to sheep; and in the spring months of the lambing season, the greater juiciness of the root places it above any other plant in point of utility, and in that respect, and in that season of the year, it is most assuredly superior to the Swedish turnip, as the milking property, and not fattening, is required; and the preserving of the roots in a fresh state into March and April is a matter of no difficulty.

The value of any article of production is constituted by its quantity and quality, two properties which seldom exist together in the same organic structure. The roots of mangold wursel contain a very large quantity of water, and though bulk must be obtained, and reckoned of great worth, as the cravings of the stomach must be satisfied, yet if nutritive value be very deficient, not much good follows, but watery scourings and other affections of the animal. Nutritive value is absolutely required, and to secure it in quantity and quality, combined with plenty, the soil must be supplied with those manures and chemical ingredients as may not fail to produce such a desired acquisition. For this purpose the above statement of the matters taken from the soil by mangold wursel plants will afford very useful suggestions. Mangold wursel is of surer growth than the turnip in all cases of an any way congenial soil; the produce is large, and the quality sufficient for keeping and fattening animals, and the increasing estimation shows the value that has appeared from late years in the use of spring food. The juiciness of the roots in the arid months of spring is a mighty recommendation.

No green crop plant confers greater benefit on the soil than is done by mangold wurzel; the tap root penetrates and divides the ground, and the profusion of spreading leaves shade the surface, lodge much moisture, to produce a damp

condition and a decay of matters on the surface of the ground, which forms a large item of the benefit secured to the land from green crops. In this valuable property mangold wurzel is not surpassed by any root that is cultivated.

THE IMPROVEMENT OF THE SUTHERLAND PROPERTY, AND THE GENERAL GOOD DERIVED FROM THE PROCESS.

In another part of this magazine (p. 316) the reader will find a translated paper on the "Small Farm System in Switzerland," in which the writer, Eugene Rister, one of the contributors to the *Journal d'Agriculture Pratique*, has thought proper, in order to illustrate the superiority of the French system over that of the United Kingdom, to make an unwarrantable attack upon the late Duke of Sutherland and his worthy Duchess, in reference to the extensive changes effected upon the wild and formerly barren property in Sutherlandshire. We appended a remark deprecatory of the charges; but considering that a further notice should be taken of it, we propose now to lay before the reader a short detail of the circumstances under which, at an early part of the present century, the transactions referred to took place. We do so in order further to counteract the scurrilous insinuations of the writer, and exonerate the noble proprietor of the Sutherland property, who, instead of so severe a censure, deserved and has obtained the approbation and applause of every right-minded man.

At the close of the last century the property in question was in the possession of its hereditary chieftain, who was called *Mhoir-Fhear-Chattaibb*, or "the Great Man of the South," whose ancestors had for centuries been the head of the Sutherland clan. Upon his death his only child, and the last of his race, inherited the estate and became Countess of Sutherland. The property consisted of 800,000 acres, chiefly wild mountain land, in a complete state of nature, producing little else than a sour herbage, scanty enough, and heather, on which a few wretched cattle and blackfaced sheep were pastured in summer, and half-starved in winter. It contained a population of 16,000 souls, who in their moral and physical condition were not much in advance of the cattle they looked after. Their cabins were constructed of mud, or stones put together without cement, and consequently exposing the inmates to the wind and rain, as well as the cold. The small quantity of land they cultivated produced but a few oats or potatoes, that frequently failed, in which case famine succeeded, and in one instance continued for seven years. Misery and want, in fact, were the normal condition of the Sutherland clan.

Soon after the death of the old chieftain the Countess of Sutherland was married to the Marquis of Stafford, a rich and benevolent nobleman, who on coming into possession of the Sutherland estate, concerted with his wife on the means for improving the condition of the people. After many ineffectual attempts to civilize and introduce better habits amongst them, it was determined

to remove them in a body, with the option of either emigrating to America, or of forming a colony on a tract of excellent land on the western coast, where it was arranged to build a town for their accommodation. In pursuance of this plan three thousand families were removed from their wretched cabins, the majority of them willingly; but others it was found necessary to eject. Many chose to emigrate to America, the Countess providing everything for their accommodation on the voyage, and a sum of money to support them upon arrival until they could obtain work. A large majority, however, settled at the new town of Helmsdale on the coast, where comfortable dwellings had been erected for them. For that purpose the Countess of Sutherland had to import all the materials required for the work. Lime was fetched from Sunderland, coal from Newcastle, slates from Aberdeen; whilst engineers, masons, quarrymen, sailors, cartwrights, joiners and bakers, were brought from the south, both to supply the needful assistance, and also to instruct the population. Churches and schools were built, and a substantial stone pier erected, the latter at an expense of £16,000. Bridges were thrown over the streams, roads were opened up to all parts of the country, and inns and posting-houses were established. The land in the vicinity was cleared of heather and burned, and then broken up and cultivated; whilst every encouragement was held out to the people to acquire habits of industry and useful knowledge.

In ten years the trade of Helmsdale employed thousands of tons of shipping, a successful fishery was opened, and in place of the heather fine crops of wheat, barley, oats, and turnips were seen, the land being cultivated upon the modern system. On the other hand, the inhabitants had become their own artisans, having been taught by the strangers, who being no longer wanted, had gone back to their native districts. From being an ignorant, idle, turbulent race, the natives have become clever workmen in all handicraft, skilful fishermen, hardy miners, and good farmers. For many years the income derived from the property was wholly expended in making the improvements necessary to promote the welfare of the inhabitants, and a course of uninterrupted prosperity has marked the progress of the little colony.

But the mountain land—what of that bleak, barren and apparently impracticable wilderness? What was done to that wild country after the equally wild inhabitants had been so "dispossessed?" All has been changed there too. Those boggy mosses which would not at any season bear a small bullock, and scarcely a sheep, and

that in winter were unapproachable, were drained—the high grounds were repaired and burned, and thus, in place of a scanty herbage maintaining a feeble existence under the heather, the mountains are covered to their summits with a fine close natural grass. The whole district has been divided into 29 sheep-farms of 25,000 acres each. The water drawn into the open drains from the mosses is now economised for the purpose of irrigating the pastures below in dry weather. Upwards of 20,000 acres of the valleys and level grounds are under cultivation, and grow abundance of corn, and green and root crops, the latter to support the sheep and other animals in the winter. Instead of a few stunted cattle and sheep, many of which were starved with cold and hunger in a severe season, these once-barren hills support nearly 200,000 sheep of the Cheviot breed, summer and winter, which produce four or five pounds of wool each, and supply the Lothian markets with 30,000 or 40,000 stock sheep annually for fattening.

Such is the present state of the Sutherland property, and such have been the results of a plan which a French writer has thought proper to condemn. It is true, that at the time when the affair was in progress a similar outcry was raised against the proprietor, both in England and on the Continent; and the matter being at length referred to in the Houses of Parliament, the Marquis of Stafford judged it proper, through his steward Mr. Loch, who had had the entire management of the property, to vindicate his conduct and that of the Countess of Sutherland. This was done in so clear and satisfac-

tory a manner, in the year 1820, that after due investigation into the truth of Mr. Loch's statement, the King conferred upon the Marquis and his Countess the title of Duke and Duchess of Sutherland.

Nor is the charge of the French writer that the Duke of Sutherland has preferred sheep to men, and that he has driven out the latter to make room for the former, less false. It is true, that on those bleak mountains you do not find the wretched hovels which formerly existed, and that their only inhabitants are the shepherds who look after the large flocks that now feed on such abundance of herbage. But the fact that the population on the entire estate has increased from 16,000 to upwards of 20,000 gives the best answer to the charge, whilst it establishes beyond a question the success of the whole proceeding, and the benevolence by which it is characterized.

When the present Duke acceded to the property in 1840, he visited his Highland tenantry, and was received with the warmest marks of attachment and respect. He found *every farmer* on the mountain estate prospering, the land having been leased to them at 1s. per acre. Those who had settled on the coast were equally successful, both in trade, agriculture, fishing and commerce, and the land around Helmsdale now yields a rental of 30s. per acre. And there, as a late excellent writer has said, has the descendant of the Mhoir-Fhear-Chattaibhs, from his lofty feudal town of Dunrobin, which overlooks the coast at Helmsdale, created and encouraged a scene of activity his ancestors never dreamt of.

THE SEWAGE QUESTION.—THE RELATION OF TOWN AND COUNTRY.

In our last paper we explained briefly the method by which Mr. Austin proposes to meet, in some measure, the sanitary requirements of this important subject now under consideration: we now propose as briefly to describe the way in which he meets its agricultural necessities.

The liquid resulting from the process described in our last paper, although comparatively pure and indeed freed from all obviously disgusting peculiarities, is far from being robbed of its fertilizing power. It still contains in solution all the most valuable properties, and these, in the present state of knowledge on the subject, can practically only be made available by the application of the water itself to the land. In some towns the circumstances of the surrounding district forbid this application, and it will be a subject for further inquiry whether, in such cases, the water flowing off should be subject to more complete deodorization than can be accomplished by the above process. But in the majority of cases there is no insurmountable impediment to this application of the liquid sewage; and the evidence clearly points out, *that if only proper means be adopted for this application, and for disposing of the produce, very great advantages may be expected from its use.*

After duly considering the results of the various plans carried practically into effect for the utilization of liquid

sewage, Mr. Austin conceives that it is only in the application of very large quantities of the liquid to the land, that thoroughly satisfactory results may be looked for. Thus, for instance, in the somewhat celebrated, because so often discussed case, of Rugby, Mr. Austin considers that the quantity of sewage liquid there distributed, should be applied to a surface equal to one-fourth or one-fifth only of the land, instead of the whole as at present, in order to obtain results similar to those obtained in Edinburgh. The large quantities of water thus necessitated are obviously incapable of being applied to the land through the medium of underground pipes with hose and jet. Mr. Austin therefore proposes to apply the liquid sewage "after separation of the solid matters" by a combination of underground mains with Beckwith's system of contour gutters. The quantity which could by this method be delivered at a certain spot, and distributed over a given area, would be limited only by the size of the pipes, and the pressure applied thereon by gravitation or engine power. By opening valves placed at convenient points, the pipes would deliver into small troughs, whence the sewage would discharge into the top gutters, and thence into cross feeders as required; and with the same sized mains, one lad would superintend the distribution of many times the quantity that it is practicable to get on to the land

by means of the usual small subsidiary pipes and the hose and jet.

In order fully to understand the peculiarities of this proposed combination of underground mains or pipes with open gutters, let us glance at the method adopted to form these gutters. For the system of operation which Mr. Austin prefers, we are indebted to Mr. Beckwith, of Crediton. The system has been applied to some water meadows, on the property of Sir Stafford Northcote, near Exeter, who furnished a description of its peculiarities in a paper sent to the *Journal of the Royal Agricultural Society*.

Along the line of the highest ground, a gutter is laid out in the usual manner, having an inclination throughout its length or fall of 2 inches in 4 yards. The width of this "carriage gutter" should be 12 inches. Towards the termination, however, these dimensions are gradually reduced till the gutter dies into the ground. On the supposition that the slope of the ground below the carriage gutter was perfectly uniform, the water supplied and overflowing its sides would be shed over the land in a uniform stream. But as, in practice, the ground generally possesses various inequalities, these cause an inequality in the shedding of the stream, this being greatest in the lowest parts, and entirely absent in the highest. To allow the equality of distribution, subsidiary gutters are carried along the ground at a lower level, but in the same direction as the main carriage gutter. Into these subsidiary gutters the water is delivered from the gutters above, and re-distributed over the land. Thus with a carriage gutter at the upper part, and a drain at the lower part of the field, the water shed from the carriage gutter would only pass over the lowest parts or hollows of the land to the drain, but by having the subsidiary gutters between these two points water is caught up and re-distributed to the land. It is obvious, however, that to distribute the water uniformly over the space of land between the gutters, these must be level throughout their length, without any fall. It is in laying out these gutters so that while they follow the peculiarities of the ground, they are kept uniformly level, that the main feature of Mr. Beckwith's system resides. A simple instrument is all that is required to mark out the line of the gutter, a plough of peculiar fashion being used to trace out the line, and cut the trough of the requisite depth and width. The instrument required consists of two battens or strips of wood some five feet long, and fastened together at the top, so as to form a triangle, the legs or extremities of which are placed at a distance of four feet apart. The two legs of the triangle are kept apart by a cross-piece placed near the apex. From the apex a plumb-line is suspended. When the two legs are placed on ground on the same level, the plumb-line crosses a notch in the cross-piece, denoting that it hangs vertically. If, however, one leg rests upon a spot of ground at a different level from that on which the other leg rests, the plumb-line will hang out of the line of the notch. By moving the free leg about, till it rests on a spot of ground allowing the plumb-line to hang vertically, the two legs will rest on spots of the same level. The spot on

which one leg rests is then marked, and the other spot is used as centre, from which the instrument is worked till the other leg is again found to rest upon a spot of the same level. By proceeding thus, working the instrument like a pair of compasses, a series of markings are obtained, which denote a line which in plan may be tortuous and irregular, but in section exactly level throughout its length. The plough passing over the line thus indicated cuts the furrow which is to serve as the gutter, the width and depth of which are about 4 inches. When in marking out the line of the gutter a spot is reached where it is impossible to get a level, "a stop is put in the gutter, and a fresh level taken for its continuation. Thus when the higher part of the gutter is fall, the water runs over alongside of it, and also flows over the stop into the lower part of the gutter, which distributes it over another portion of the field.

KEIGHLEY AGRICULTURAL SOCIETY.—The seventeenth annual exhibition of the above society was held in the field known as the Cricket Field, on the Skipton road, near the Mechanics' Institution. The entries were on the whole fewer than last year, the total of all kinds of animals, and butter, agricultural implements, &c., being 647. The exhibition of bulls was excellent. The sheep of various classes were also excellent, and many of the horses exhibited were of prime quality. The poultry show was large, and Mr. James Dixon, of Bradford, and Messrs. Beldon and Bird, of Ecclehill, carried off several prizes. The pigs sustained the high character achieved by the district for rearing the porcine breed. In the afternoon the judges, exhibitors, and friends sat down to an excellent dinner in the Devonshire Hotel, when the Marquis of Hartington presided. We have not space to publish a full list of the prizes, but we may mention that in the gentlemen's class the prize (a silver medal or £3) for the best bull was awarded to Mr. William Gomersall, of Otterburn; and the second (bronze medal or £1) to Sir Charles R. Tempest, Bart., Broughton Hall. Mr. Henry Ambler, of Watkinson Hall, obtained the prize (silver medal of £2) for the best short-horned bull under two years old, in which class there was no competition. The prize (silver medal or £1 10s.) for the best bull calf, was gained by Mr. Gomersall; and the second prize (bronze medal or 15s.) by Mr. Henry Ambler. Sir C. R. Tempest obtained the first prize (silver medal or £3) for the best short-horned cow; Mr. R. Middlesbrough, of South Milford, the second prize (bronze medal or £1); and Mr. J. G. Sugden, of Eastwood House, was highly commended. Mr. Joseph Simpson, of Spofforth Park; Mr. Stephen Barrett, of Harewood Bridge; and Messrs. Brearcliffe and Firth, of Dunsawick, obtained prizes for sheep. Amongst the successful competitors for premiums for horses were Messrs. Lister and Cockshott, of Addingham; Mr. George Smith, of Keighley; Mr. John Smith, of Keighley; Mr. W. Parker, of Keighley; Mr. J. Ingham, of Bradford; and Mr. J. Craven, of Keighley. Mr. J. Greenwood, M.P., of Swardcliffe Hall, obtained the prize (£2) for the best hunter, in which class there were six entries. Mr. W. B. Wainman, of Carhead, obtained a large number of the prizes offered for pigs. In the poultry classes Mr. James Dixon, of Bradford, was a very successful competitor, carrying off several premiums. Messrs. Bird and Beldon, of Ecclehill Moor; Mr. J. Tiplady, of Shipley; Mr. J. Smith, of Keighley; and Mr. J. G. Sugden, of Eastwood House, also obtained prizes. £3, the prize for the best plougher, was awarded to Eli Dawson, of West Morton; and £1 10s., the second prize, to Amos Mawson, of Bradford. There were nineteen entries. For the best plougher under 18 years of age, a prize of £2 was offered, and it was obtained by Samuel Jennings, of Hawksworth. The second prize (£1) was awarded to Allen Hudson, of East Morton. There were only three entries.

THE PRESENT CONDITION OF AMERICAN AGRICULTURE.

(Continued from page 194.)

Of the journals enumerated in my list, some, in addition to agricultural matter, contains much of a miscellaneous nature, the better to ensure a wide circulation; but all of them look directly to the agricultural classes for support. Mr. J. S. Skinner, after leaving the *American Farmer*, edited the *Farmers' Cabinet*, a useful publication, carried on for some time by Messrs. Greely and McEbrath, proprietors of the *New York Tribune*; and in 1848, he established the *Plough, Loom, and Anvil*, an agricultural and mechanical journal, as its title imports. The most remarkable instance of success, in our time, of an agricultural paper, is the *American Agriculturist*, which three years ago, by mismanagement or other causes had almost run out of existence; its subscription-list having been reduced to a few hundred. When it had reached the close of its XIVth Volume, it was purchased by Mr. Orange Judd, for a paltry sum; but he speedily brought about a decided change for the better. In the three years and a half which have elapsed since that time, he has spent 23,000 dollars in advertisements, and about 3,000 dollars in the purchase of seeds for gratuitous distribution as prizes or premiums for single subscriptions, and clubs. His plan has been to give to each subscriber one or more small packages of rare seeds to be selected at option from a lengthy assortment published in his paper. In this way he is said to have distributed over a ton of Chinese sugar cane, or *Sorgho* seed, and other things in proportion to their place in public estimation. The result of his advertising is shown in the fact that his paper bill for a single month is 202½ reams, which allowing two sheets to each paper, or 250 papers to the ream, shows a circulation of over 50,000 copies. There can be no question that success now-a-days is mainly dependent upon judicious advertisements.

There is perhaps no influence at work in this country so potent in awakening public interest in agricultural improvement as the *New York Tribune*, which by its position and circulation in the rural districts is a mighty agency for good. The circulation of the weekly edition of the paper is above 175,000 copies, and throughout our great Western territory a copy may be found in almost every house. It is the only one of our New York dailies that makes agriculture one of its leading features, and its influence with the producing class is correspondingly great. On a late occasion it sent its special agricultural reporter a journey of eleven hundred miles, merely to attend Mr. Alexander's sale of Short-horns, and is now publishing a series of sketches of our leading herds and farms, somewhat in the style of the articles, on the "Herds of Great Britain."

With these facts, then, before you, does it not seem as if we had a great promise for the future?—as if, when necessity compels our farmers to apply science to

their operations, we should be ready and able to see the truth, and to utilise it too?—that the 300,000 agricultural papers now regularly lying on farmers' centres, would be a mighty leaven to raise the whole mass and bring about a better system of farm management?—that an American, mindful of the achievements of our mechanics, should look for the time when his farming implements shall be cheerfully recognized as the most efficient in the world?—and when, to know what manure is best for this crop or that, and what will cure this or that trouble in his herd, he will not be obliged to consult even so good a foreign authority as the London *Mark Lane Express*.

The two steam ploughs, described in former letters of this series, are not the only ones before the American public. I have one in my mind's eye at present—one invented by Mr. Charles F. Mann, of Troy, New York. The inventor is proprietor of a large machine-shop, and a thorough mechanic, of course. It having been suggested to him that a steam-plough was a great desideratum for our farmers, he commenced experimenting a year or two since, and last fall called upon the New York State Agricultural Society to report its worthiness or unworthiness to receive the prize offered by the Society. Accordingly, a committee was appointed, and the machine was tried with tolerable success. The engine is intended, as usual, as a tractor of a frame of ploughs, but was specially designed to draw loads on common roads as well. In this latter respect it meets with commendation at the hands of the committee, for they say:

"The power of draught evinced; the facility with which the engine was steered; the fact that it could surmount the obstacles of rough ground, of soft, wet spots, and of considerable elevations, and all without sufficient jolting to displace or impede the working of its machinery, surprised the best mechanical judges who were present; and, while the current opinion was that the whole affair was still too crude to be considered in the light of a 'steam-plow,' the hopes of the most incredulous could but be excited for the ultimate accomplishment of all that is desired in such an engine."

In all these particulars it does not greatly differ from *Boydell's* engine; but let us see in what Mr. Mann's method of laying his track is peculiar. The machine is thus described in the report of the judges:

"The platform of the engine rests upon two main travelling wheels, four feet in diameter; the forward end supported by a double castor, or two-wheeled truck, turned to right or left by the steersman above. These castor wheels are two and a-half feet in diameter, and flanged; a slack chain of traction links, each link twelve inches long and six inches broad, revolves of

itself within the flanges, so that one link always forms a square support to the convex surface of the wheel, while the chain is loose enough for a second link to be flat upon the ground, when the wheel passes off from the one behind it. This is very ingeniously arranged, although we do not know whether it is new or not.

"The main travelling wheel on each side is surrounded by an endless chain, composed of links fourteen inches long and twelve inches broad, which forms the track on which the wheel runs. But the power is not applied directly to the wheel as in the driving-wheel of a locomotive. The endless chain (which is composed of eighteen links in all) passes forward of the travelling wheel, around a wheel eighteen inches in diameter, which wheel is not round, but *pentagonal*, and has forks at each angle, fitting between the links of the endless chain.

"The power is now applied in this way: A cylinder on each side of the boiler turns a six-inch pinion at a high rate of speed, say one hundred and fifty revolutions per minute; this pinion plays into a large twenty-two inch cog-wheel upon the shaft of the pentagonal driver; and as the speed by this gearing is decreased, the amount of power is correspondingly and very greatly enlarged.

"The driver pulls the endless chain around, which draws upon the top of the travelling-wheel; thus, in reality, making each spoke in that wheel, act like a lever of the second class; having the ground for the fulcrum, the axle of the wheel for the weight or resistance, and its upper surface for the power in *prying the machine along*. The upper side of the endless chain is thus constantly tight, while the lower side is slack, and hangs down loosely enough to supply the travelling wheel constantly with a firm track or support.

"This mode of applying power we believe to be novel and original, but we have no means at hand of determining with certainty.

"The endless chain, which, as will be seen, must be very strong to meet the *pull* upon it, is composed of square iron frames, in which a wooden shoe is secured of two-inch plank; the whole is said to weigh 8,000 pounds, and to be able to carry fuel and water for five hours' work. The engine was, as we have seen, a double one, operating on quarter-cranks, to avoid any dead centre in turning the drivers; the cylinders carried five and a-half-inch pistons, and ten-inch stroke, and the amount of steam calculated for average use was 70 lbs.

"The boiler, however, did not seem quite capacious enough to supply steam to the full capacity of the machinery."

You, who have watched the progress of Mr. Boydell's experiments will understand whether our American inventor is destined to be rewarded for his pains. I must confess to some doubts as to the utility of traction engines for farm purposes, but I can do no less than record the experiments of their friends. Whether or no "Talpa's" idea of a soil-crunching machine will ever be put into practical shape, is more than can be prophesied at present. If it can, the ingenious producer will reap a rich harvest in America, as well as in England. In

addition to the liberal premium of the Illinois State Agricultural Society for an efficient steam plough or cultivator, the Illinois Central Railroad Company have announced their intention of adding to it, that a worthy remuneration may be made to the enterprising man who will bring a plough to cultivate the fertile prairies of the New State. I do not think that either Fowler's, Smith's, or Boydell's apparatus would meet with favour—for they are either not effective enough to suit Western ideas, or too expensive for our pockets. An American farmer is, perhaps, a little unreasonable in his demands; he must have a wonderfully effective farm tool at a nominal cost. Unlike your own cultivators, he will not pay high prices to secure great durability. He does not wish his implements to last for ever, for he argues that in this inventive country something twice as good might be afforded at the same price before his costly implement should be half worn out. "Give us cheap tools that will make good work," he says, "and when they are worn out we will buy more." And I think we are right, for beyond a certain point of durability it is useless to go—the increased strength is often secured at the expense of portability and easy management.

The weather during the past three months has been somewhat unusual, and that of June remarkable. Winter grain has been favoured by a continuance of showery weather in many sections of country, and there is every indication that the general crop will, to say the least, be an average one. Spring crops, which need a warmer temperature, are somewhat backward, and in the western parts of this State, fears have been expressed that our Indian corn would not mature, unless a change should come. The fields from Albany to Seneca county do certainly look unpromising; but the week of hot weather through which we have just passed will have its favourable effect. I do not think I ever saw so little injury from weevil and Hessian fly as this season, and attribute it in part to a remarkable frost which swept over a large section of country in the early part of June. On the night of the 4th of June, when by rights the thermometer should have marked an average of 65 degs., the mercury fell in places much below the freezing point, and ice was formed in Ohio, to the thickness of half-an-inch. Two days after, I came from central Kentucky diagonally through Ohio, and in the vicinity of Columbus saw the tops of shrubbery alongside the track scorched and blackened by frost, as if a simoom had passed over them. Corn (maize), rye, all fruits, and garden vegetables were badly cut up, and a gloom settled down upon the farmers of the West, at the thought that on the heels of two poor seasons a third was to follow. The result that we can fully see, now that a month has elapsed, is less unfavourable than had been anticipated, and while great local injury has been inflicted, the aggregate is but small. In Ohio, where the loss was supposed to be most considerable, the smitten territory may be bounded on the south by the National road, on the west by the Columbus and Sandusky railroad, and on the east by Pennsylvania; the whole making a quadrangular plot. The yield of this tract, as

reported to the State auditor in 1857, when an extraordinary crop was reaped, was 7,907,918 bushels, leaving as the product of the rest of the State 17,499,701 bushels, and when we consider that not more, certainly, than one-fourth of the crop in the quadrangle was destroyed, the actual loss to the State seems small. In Western Pennsylvania and Virginia, in portions of New York and Illinois, more or less damage was done; but it is a question in my mind if the destruction of noxious insects does not counterbalance the injury to vegetable life. I cannot see that it will be necessary to alter the estimates of crops, given in my former communications.

Efforts have been made for years past to cultivate fruits in the prairie country of the West, and millions of trees have been sold for that purpose by the nurserymen of the Eastern and Western States. The retentive clayey loam subsoil, which underlies the prairie lands, is supposed, however, to operate unfavourably on the growth of trees. If a thorough system of drainage could be pursued, there would be no ground for this complaint; and I am not sure but that in a great extent of territory, such could be arrived at. It has been computed that the loss of fruit trees within the last three years in Illinois has been not less than three millions of dollars. There can be no question but that when the sweeping winds strike full upon the trees in winter, thousands must be injured; but it is claimed that belts of evergreens can be planted so as to withstand the winds, and protect fruit orchards—a plan which seems entirely feasible.

On the 7th of this month the corner stone of the New York State Agricultural College was laid at the experimental farm, on the banks of Seneca Lake, in the presence of a large concourse of people, by our late Governor, the Hon. John A. King. The ceremony I was fortunate enough to witness, and shall look back to it with pleasure hereafter. The farm is well chosen; for it comprises many varieties of soil, suitable for a wide range of experiments with various crops and modes of treatment. The institution is in the hands of our best men, among whom I may mention our late Commissioner to the World's Fair, Colonel Johnson; and, if the farmers will but subscribe funds, must enter upon a career of great usefulness. The trustees propose to charge 200 dollars (£40) per annum for board, tuition, &c., of pupils; and to make the course extend over three years. Two hundred dollars is not much to pay in comparison with the enormous return the farmer would get from the better farm management of his educated son; but as our farmers have not yet been taught to feel that their sons should be specially educated to manage a farm properly, I believe this noble college will languish out a miserable existence, unless either the State Legislature come to its rescue, or the farmers learn better. If powerful influence and hard-working members will avail taught to the Board of Management, the College will succeed, and perhaps the brilliant auguries of the day of opening may point to the noon-tide glory of absolute prosperity.

DESCRIPTION OF A TRACTION ENGINE, AND OF THE IMPLEMENTS TO BE WORKED THEREWITH, IN THE APPLICATION OF STEAM POWER TO TILLAGE AND OTHER OPERATIONS OF AGRICULTURE.

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It is not less feasible, and certainly not less important, that steam-power should be applied to cultivation, than to the staple manufactures of the country, to steam navigation, and to railway communication. For some years past the attention of many mechanical engineers of eminence, and of practical agriculturists, has been directed to the application of steam-power to cultivation; but hitherto without that success which might have been expected in so important an object.

This failure of success has arisen not only from a defective application of the power itself, but also from a persistence in the use of implements, as a medium of the application of the power, which, from their action, are ill adapted to the purpose. On this subject, Mr. Hoskyns in his able article on "steam culture" in "Morton's Cyclopaedia of Agriculture," published in 1855, remarks that "it is true that no demonstration has ever been attempted of any

special inaptitude of steam-power for the work of cultivation. The impediments it has had to encounter have been those of delay, rather than denial, or even mistrust, of its ultimate possibility; and the delay itself has been due rather, it would seem, to error than neglect—the error so long persisted in, of regarding the plough as the *sine qua non* of field cultivation, and the necessary medium through which the steam-engine was to be applied to cultivation."

It will not, it is hoped, incur a charge of presumption in any individual, who having given the subject of application of steam-power to cultivation long and attentive consideration, in offering a few suggestions by which so desirable an object as that in question may be promoted; nor will apology for craving space in the pages of your valuable miscellany with that view be required.

With the above-quoted remarks of Mr. Hoskyns-

the writer of the present paper entirely concurs; and he might, if any doubt can exist of the truth of the action of the plough being inefficient in its purpose, especially in its not being "the necessary medium through which the steam-engine was to be applied to cultivation," quote the observations on the subject of steam culture, in a lecture to the Manchester Royal Institution, March, 1849, and contained in the article already adverted to; but the admirable text book on all topics in any way relating to agriculture referred to, being he supposes, in the possession of most persons interested in field culture, it will be unnecessary to trespass here by any further quotation from the article in question.

The principal cause of failure in the use hitherto of steam-power to the purpose in question has been in the persistence in the use of implements, in which the action is simple traction through the soil. Although it is intended to reserve lengthened remarks on the implements to be used with the steam-engine in the tillage operations of agriculture until after having first treated of the *motor* for the purpose, yet it may be here remarked that the power of steam can never be applied to cultivation with complete success unless a considerable breadth of ground be efficiently operated upon at once, with the least amount of resistance from friction in the working of the implements. In this, simple traction must be superseded by a revolving action.

In considering the subject of the application of steam-power to tillage operations of agriculture, it will readily be perceived that there are two modes by which the steam-engine may be available for the purpose, viz.:—by traction of the implements to and fro, by means of chains or ropes, by stationary engines, but which are advanced at right angles to the line of traction, as the breadth of ground worked at once by the implements is operated upon; and by locomotive engines, to which the implements used in the operation are directly and immediately attached.

In the first of the above-mentioned modes of applying the steam-engine to cultivation, the pressure of the weight of the engine on the soil is confined only to a portion of the ground to be worked, that is, to the headlands; but, on the other hand, such engines and their working gear are necessarily of a somewhat complicated construction; and a considerable amount of force of the moving power is absorbed in the strain required to produce motion in the implement—particularly in fields of considerable extent, in which the ropes used are of great length.

In the other mode, the principal defect consists in

the pressure of the weight of the engine travelling on the ground to be worked; but this objection, if it cannot be entirely obviated, may be greatly mitigated, by distributing the whole weight on as many points of bearing and on as great a surface as possible. On the other hand, nearly the whole force of the engine is available to the working of the implements, from their being directly and immediately attached to the moving power. Under all circumstances, this principle of action in the engine is quite as favourable, if not to be preferred to the other, for the purpose of applying steam-power to tillage operations of agriculture; besides which, it is not to tillage alone that such an engine may be applied, but also to drawing carriages on fields and on roads.

In designing an engine with a view to the successful and to the most extensive application of steam-power to tillage operations, whichever of the two principles already described may be adopted, the following are the most important matters for consideration:

1st. That its construction should be as simple as possible, consistent with efficiency in its operation.

2nd. That its working parts should be as little as possible liable to derangement and requiring repair; and when repairs may be necessary, either from accident or from long use, such repairs may not be of an expensive nature.

3rd. That it should be easily managed by agricultural labourers of ordinary intelligence.

4th. That it should be of as moderate cost to purchase as may be consistent with efficient working; of sufficient power with a moderate quantity of fuel for the purpose it may be required; and that it should be durable.

The foregoing remarks are general, rather than specially addressed to the subject of the present paper; but as they elicit the views of the writer on the subject of the application of steam-power to cultivation generally, such trespass on the present occasion may, it is hoped, be excused.

The special and direct object of the present paper is to submit to the consideration of mechanical engineers and the agricultural public a description of an engine for the application of steam-power to tillage and other operations of agriculture, which, perhaps, may be found to possess the properties noticed as being requisite in an engine for cultivation by steam-power.

From a previous remark it may perhaps be inferred, that the writer is in favour of the locomotive principle of action. After long and attentive consideration of the subject, and many discussions thereon with mechanical engineers of experience,

the writer would decidedly recommend locomotive action for the purpose in question.

The locomotive action being assumed to be that adopted, the breadth of ground operated upon at once by the implements will limit the size and construction of the engine. For if the breadth of ground operated upon at once by the implement be less than the breadth of the engine, a portion of the ground will either be left uncultivated, or a portion of that cultivated will be injured by the pressure of the wheels on one side of the engine. In the latter-mentioned case also, the engine, from the wheels sinking deeper on one side than on the other, will be out of its transverse horizontal position; that is, it will be as if moving across the slope of an inclined plane, which would be a position of obvious disadvantage and inconvenience. Besides the size of the engine being thus limited, in order to obtain room and convenient arrangement of purchase gear, by which to multiply the power, a vertical boiler will be that to be adopted.

In the engine about to be described, the FRAMING will be best of π iron, and forming beams with hollow sides, 6 inches wide by 9 inches deep, and the thickness of the iron $\frac{1}{2}$ inch. Such a beam will be sufficient to bear a much greater weight than that of the engine, but should additional stiffness be necessary, the hollows in the sides of the beams may be filled in with oak timber of a scantling of 8 inches by $2\frac{1}{2}$ inches, and secured in their places by through bolts at frequent intervals.

The WHEELS, it is proposed, should consist of a pair of driving wheels, 5 feet in diameter, placed in the mid-length of the framing, and a pair of steering wheels, 2 feet 6 inches in diameter, near each end; the last-mentioned wheels being so small in their diameter in order that they may lock completely under the platform of the machine. The whole of the wheels will be best made of malleable iron, the felloes and arms being hollow, the latter cast into cast-iron bosses or naves, and the felloes made in segments; the tires should be hoops of malleable iron, 12 inches broad and $\frac{1}{2}$ inch thick, which, being put on the felloes hot, will, by contraction, keep the several parts of the wheel firmly in their places, and the whole will be of great strength combined with lightness and durability. The axle of the driving wheels should be 3 inches in diameter, those of the steering wheels 2 inches in diameter, the whole made of the best forged scrap iron.

The arrangements of the position of the wheels should be such, that from the outside of one driving wheel to the outside of the other should be the extreme breadth of the machine; the hinder pair of

steering wheels should be just clear of and within the track of the driving wheels; and the front steering wheels should have the same relative position to the hinder steering wheels that the latter have to the driving wheels. So that were the wheels all of the same diameter, and placed upon the same axle, they would form two cylindrical rollers, of three parts each, on the same axle, with an interval of a few inches, at mid-length of the axle, between them.

By such arrangement, the whole weight of the machine will be distributed over six wheels, each 19 inches in breadth, or an aggregate breadth of six feet, and none of the wheels following in any part of the track of the others, the pressure of the weight of the machine on the land will be reduced to a *minimum*.

The BOILER, as it has already been stated, is a vertical one. It is proposed that the height of the principal part or cylinder should be 8 feet, with a further height of about 1 foot 3 inches, and of 2 feet diameter, as additional steam chamber. Inside the main portion of the boiler is the fire box, 3 feet in height, having a hemispherical dome 3 feet in diameter, with a flue 1 foot in diameter, rising from the said dome, and passing through the steam chamber. As to the diameter of the boiler, it should be as follows, viz:— Fire box 3 feet; water space round the fire box 3 inches; thicknesses of the plates, $\frac{1}{4}$ inch each, in the whole $1\frac{1}{2}$ inch; making 3 feet $7\frac{1}{4}$ inches as the outside diameter of the boiler. The outside shell, fire box, and so much of the flue as is within the boiler, should be made of the best Yorkshire or Derbyshire plates, $\frac{1}{4}$ inch thick, and put together with $\frac{1}{4}$ inch rivets, 2 inches apart, centre to centre. The chimney above the boiler need not exceed the thickness of No. 7, on the Birmingham wire gauge; and in the chimney there should be a damper, with the necessary means for opening and closing it, within the perfect command of the stoker. The boiler should be fitted with safety-valve loaded with Salter's spring balance, steam pressure gauge, glass water gauge, steam whistle float, blow-off and sludge cocks, and every other appliance for safety and convenience of the most approved construction. In order to bring the centre of gravity of the boiler as low as possible, and also to bring its top to a convenient height above the platform of the machine, the boiler should be slung from the sides of the frame by saddles or inverted brackets of plate-iron, 3 feet in length, riveted to the sides of the boiler, and bolted to the frame by 3 bolts at each side, so that the fire grate may be 2 feet below the level of the platform of the machine.

The **ENGINE** should consist of three vertical cylinders, the pistons of which may be each of them $4\frac{1}{2}$ inches in diameter, with a stroke of 12 inches. These, with their steam chests, should be firmly bolted to the boiler near to its top. The connecting rods will work 3 cranks at equal distances, or 120 degrees apart, by which only one crank would ever be on a dead point at one time, whilst both the others would always be on either the ascending or descending stroke, and by which a fly wheel would be dispensed with. This arrangement may be looked upon as unscientific, not only in dispensing with an equalizer of the stroke, but also in increasing the friction. In answer to such objections, it may be remarked, that in the case in question a fly-wheel would be found most inconvenient, if not inadmissible, from the danger of its velocity, and its weight not only being a considerable addition to that of the machine, but also in increasing the height of the centre of gravity; besides which, the difficulty, or rather the impossibility of placing this great equalizer of the motion of the engine in its proper position, without sacrifice of convenience of arrangement of most of the other parts of the machine; and the additional friction of the three cylinders is trifling to the advantages which, in the particular case in question, would be derived from the arrangement of the engine as described. The engine should be fitted with a governor, and a feed pump.

An engine of so short a stroke as that just described, and supplied by the quantity of steam capable of being generated by the boiler previously recommended, will give at least 120 double strokes of the pistons per minute, which if communicated directly to driving wheels of 5 feet in diameter, would produce a travelling velocity in the machine of more than 21 miles per hour, or more than six times that at which the machine need, or ought to travel when working. Therefore to bring down the rate of travelling to the proper working speed, and thereby to obtain a six-fold force of traction, the crank shaft should have on it, beyond the cranks, pinions, say of nineteen teeth, working into spur wheels having 37 teeth on an intermediate shaft: on this last-mentioned shaft, to the outsides of the spur wheels, should be pinions of 19 teeth, working into spur wheels having 59 teeth on a third shaft, which should extend beyond the outsides of the driving wheels. The motion of the last-mentioned shaft should be communicated to the driving wheel axle by means of an endless flat chain on each side of the machine, passed over sheaves on both shafts. The sheaves may either be round, with protuber-

ances on their peripheries, to suit small links in the chain, or they may be canted, and the links of the chain so arranged as to hinge over the angles of such sheaves.

The **STEERAGE** of the machine, both before and behind, is proposed to be effected in the following manner, viz.: by turn-tables like those used on the fore-wheel axles of four-wheeled carriages, the lower circular plate of which to have spur teeth on half its periphery, into which the teeth of a pinion is to work. The proportion of the radius of the semi-circular toothed segment to that of the pinion, is proposed to be about three to one. On a spindle from the pinion in question, at a height of 2 feet 6 inches above the level of the platform of the machine, it is proposed to have a horizontal tangent wheel and screw, in proportion of four to one; and on the axis of the screw a winch handle, the crank of which to be three times that of the diameter of the barrel of the screw. The upper or fixed circular plates to have small friction rollers on their faces, to prevent the opposing surfaces of the plates rubbing against each other. A mitre wheel on each of the pins or spindles passing through the centres of the fixed, from the lower or moveable plates, working into another mitre wheel on a short axle, carrying a small pulley, connected by a round band with another pulley, of the same size, on a short axle, supported by a bearing on the framing of the tangent wheel and screw, will give motion to a pointer keyed on to the axle of the upper pulley, to indicate, on a semi-circular dial, the amount of steerage. Such steerage being at both ends, and worked in contrary directions, will bring the machine round nearly on its centre; and the great power of the gearing proposed for the purpose, will render but a very trifling force necessary in steering.

Between the fore-steering gear and boiler *longitudinally*, and between the purchase gear on each side of the machine *transversely*, it is proposed to have a cistern, to contain from four to five hours' supply of water for the boiler; and also to have five hours' supply of fuel (coke) piled on the platform of the machine behind the boiler.

A suitable machine for applying steam-power to field cultivation having now been described, in most of the principal points of its construction, with sufficient perspicuity, it is hoped, to be understood without the aid of diagrams for elucidation, it may not be out of place to offer some brief remarks on the economy of its use.

As to the dimensions of the machine—

Its length is proposed to be	ft. in.	15 0
Its breadth is as follows, viz.:		
Outside diameter of boiler	ft. in.	3 7½
Breadth of side beams of frame, 6 in. on each side	1 0	
Intervals between driving wheels and frame, 1 in. on each side	0 3	
Breadth of driving wheels, 1 foot each	2 0	
Extreme breadth of machine	6 9½	

As to the weight of the machine—

Boiler, engine, and purchase gear, with water in boiler, and fuel in the fire box	41 cwt.
Frame, wheels, and water tank	22 „
Water in tank	10 „
Coke on platform	8 „
Total weight of machine	76 cwt.

The foregoing statement is fully the total weight of the machine, including a supply of water and fuel for half-a-day's consumption. The following comparison with a wheel carriage passing over the ground may convey an idea of the pressure on the soil by the weight of the machine. A single-horse Scotch cart with its load is seldom less than 24 cwt., that is, 9 cwt. for the cart, and 15 cwt. for the load. It may be said that a portion of this load is borne on the back of the horse; but in answer to such exception, it may be replied that the horse bears a much less portion of the load than his own weight, besides which, the trampling of the horse is more injurious to the tilth of the soil than the weight of the cart wheels; and therefore, in the comparison about to be instituted, there need not be any deduction from the whole of the load of 24 cwt. being borne by the pair of wheels of the cart. Supposing the hoops of the wheels of a single-horse cart to be each 3 inches in breadth, there is a weight of 24 cwt. supported on a breadth of 6 inches; whilst in the engine there is a weight of 76 cwt. supported on a breadth of 72 inches. That is, in the cart 4 cwt. per inch of breadth of the wheels, against little more than 1 cwt. in the engine; or, in other words, the pressure of the engine is only about one-fourth of that of a loaded single-horse Scotch cart.

The engine described in the present paper, with a pressure of steam on the pistons of 40 lbs. per square inch, may be considered as six-horse nominal power; but by the purchase gear, the machine becomes equal to 36-horse power. Allowing 12 horse-power to be absorbed in propelling the machine itself on tilled land, which must be allowed is an ample deduction for that purpose under the

most unfavourable circumstances, there remains 24-horse power available for the traction of implements, which amount of force will scarcely ever be required in tillage operations, except when ascending planes of considerable inclination.

The machine, being simple in its construction, may be easily managed by agricultural labourers; it is not, if well made, liable to be out of repair; and when, by accident or otherwise, repairs may be required, these may be readily effected at a moderate cost.

Besides the use of the machine for locomotive traction, by having the ends of the crank axle extended somewhat beyond the side framing, it may, on removal of the purchase gear, be used as a fixed engine, for driving fixed machinery up to, or even beyond, six-horse power.

Before proceeding to specify the construction of the implement to be used as a means of applying steam-power to cultivation by the engine previously described, it may be well to state the operations of tillage that it may be required to perform.

In the first place, a more or less frequent inversion of the soil, according to circumstances, is indispensable. In the second place, a complete comminution of the soil, so that the greatest number of particles may be acted upon by air and moisture, and, at the same time, a commixture of the particles with manuring substances, applied to maintain and increase fertility, must be thoroughly effected; and another most important end to be obtained by this means, is a complete removal of all weeds. And lastly, when the soil has been thoroughly underdrained, the subsoil may be broken up, and after having been fitted by the action of air and moisture for supporting vegetation, it may be mixed with the surface soil, by which the staple may be deepened, and thus enlarge the pasture of plants. It is for the purposes just mentioned that the implements about to be described are suggested for the consideration of the agricultural public.

It has already been stated, when treating of the motive power, that whatever implements may be employed in steam culture, simple traction should be superseded by a revolving action. The advantage of revolving action over simple traction is much the same as that of the action of a wheel over the action of a sledge. And it has also been stated, for the reasons given, that whatever implements may be used with a locomotive engine as the motive power in steam culture, the implement should operate at once on a greater breadth of ground than the extreme breadth of the engine.

For an inversion of the soil, the writer suggests a revolving implement of the following construction, viz.:— Let a circle be described of a certain radius, to which, at the extremities of two diameters intersecting each other at right angles, let tangents be drawn. Then with a certain radius from the points of contact of the tangents with the circle, describe arcs cutting the tangents; and these arcs will be the curves of the blades or spades.

The working part of the proposed implement should consist of a cast-iron nave, 12 inches in diameter, and 3 inches thick, into which should be sunk four tenon beds, arranged parallel to tangents to the axle, afterwards to be mentioned. These tenon beds should be 2 inches deep and 2 inches wide, and slightly dovetailed or tapering towards the circumference. From the naves just described four arms should protrude 12 inches beyond their circumferences, and which will be the limit of the depth to which the implement will work in the soil. These arms, to which the blades or spades are to be attached, should be nearly flat, about $\frac{3}{4}$ inch thick in the middle, with cutting edges of a concave form, and should have tenons to fit accurately into the tenon beds previously noticed, and the flat part of the arms should shoulder on the circumference of the naves. The blades or spades should be 12 inches in breadth, by 18 inches in length, and instead of being rectangular in their form, they should be rhomboidal, having their opposite acute angles 56 degrees; and, to keep the arms firmly in their places, circular cast iron plates, of the same diameter and 1 inch thick, should be bolted to the naves over the tenons of the arms. The naves, arms, and blades, should be keyed on to an axle of the best forge scrap iron 3 inches in diameter, so that the sides of the blades may touch each other, and so arranged that the obtuse angle of one blade may join the acute angle of the next, and the cutting edges of the mouths form a continuous diagonal line; and if seven of these blades form the working part of an implement, its length will be 7 feet, and form a horizontal spiral, about 3 feet in diameter, with a pitch of 14 feet or double the length of the implement. The blades, and also the concave cutting edges of the arms should be of steel.

The working part of the implement described above, should be mounted on an iron travelling frame, having a pair of wheels towards the back, and a pair of leading wheels on swivels in front; and provision should be supplied for raising the working part out of the soil when turning, or travelling out of action, and for regulating the

depth at which the implement may be required to be worked in the soil. The last mentioned provision may be effected by means of a pinion working into a toothed sector, with the axle of the working part bearing in a radial arm or bar opposite to a bisection of the arc; and such purchase should be further assisted by screws working into wheels on the pinion axle, to which motion should be given by a winch handle on each side.*

A complete inversion of the soil being obtained, whenever it may be required, by the implement above described, the comminution and aëration of the soil, and, at the same time, the thorough removal of weeds, may then be effected by the revolving cultivator as made by Mr. Matthew Gibson, of Newcastle-upon-Tyne, which, for being worked by steam-power, may be described as follows, viz.:— It consists of a number of cast iron discs or naves, 12 inches in diameter and 3 inches thick, with a further thickness on each side of $\frac{3}{4}$ inch and 4 inches in diameter, revolving independently of each other on a round iron axle 3 inches in diameter. On the periphery of each disc are fixed, alternately on each side, ten strong iron curved teeth, of a length to penetrate vertically 12 inches into the soil, with points of a diamond form and steeled; and between each disc is a bar of flat iron, with the edge downwards, and curved with a convexity towards the teeth as they emerge from the soil, to keep the teeth clear of weeds grubbed out of the soil, and, at the same time, to break any clods of soil that may be lifted by the teeth. The last-mentioned bars, for their support, and also to prevent soil from entering and shearing the axle, should embrace the discs at their joints with each other, and their other ends supported by bars, extending across from the lifting sector on one side to that on the other. In order that the implement may cover a greater breadth of ground at one operation than the breadth of the engine, the number of the discs on the working part should not be less than twenty. The implement now being described will work to any depth in the soil that may be desired, not exceeding 12 inches below the surface; the depth being regulated, and the working part being removed from the soil when turning, or

* The idea of this implement was taken from a paper on "New Processes, Rotary Forking and Digging," read at the Central Farmers' Club, London, by Mr. Clarke, and which appeared in the *Mark Lane Express*, February 15th, 1858. The writer of the present article has had a model made of the working part of the implement suggested, by which he finds it will efficiently perform the purpose required.

travelling when out of action, by the same means as has been previously described for the purpose, when treating of the implement for inverting the soil.*

The most important application of steam-power to cultivation would be in the operation of subsoiling or breaking the under-soil without bringing it in its crude state to the surface, preparatory to deepening the staple at a future time. In this, three operations are required to be simultaneously performed. Opening a trench or furrow in the surface soil; breaking or forking the sub-soil; and filling the trench or furrow in the surface soil as the work proceeds. To effect these operations of the same breadth at once, which has been recommended to be done in the other operations of tillage, previously treated of, would require a much heavier implement than would be manageable; and besides which, the nature of the operation does not necessitate the implement being wider than the engine, without taking into consideration the much greater force required in working an implement for the purpose in question. Perhaps 3 feet at once would be as great a breadth as an implement for the purpose could be easily managed. In conformity to the recommendation of a revolving action in the implement, its construction may be described as follows, viz.:—Three cast iron cylinders of 2 feet in diameter, 1 foot in length, and 2 inches in thickness, formed in the manner of wheels, with arms of malleable iron in pairs, cast into a nave in the centre and into the cylinder. In the periphery of the cylinder should be 12 rows of mortices across the length of the cylinder, three in each row, and tapering slightly towards the inside. The size of these holes to be 2 inches by 1 inch, the larger dimension to be in the direction of the circumference of the cylinder. In the mortices should be slightly curved teeth, the points of which to be diamond shaped and steeled, and project fully 12 inches beyond the circumferences of the cylinders. These teeth should be 1 inch thick, 3 inches wide at the shoulders, tapering to 1 inch wide at the points,

* This is the revolving cultivator as first made by Mr. Matthew Gibson, of Newcastle-upon-Tyne, in 1853. Revolving implements for tillage were suggested by the writer of the present article in the *Farmer's Magazine* for October, 1848. The implement as made by Gibson is most efficient for its purpose; but owing to the great horse-power required to work it, it never came extensively into use; but if used by a steam-engine as the tractive force, the same objection to its use will not exist, and it will be found to be the most valuable implement for its purpose that has probably ever been invented.

and keyed through slots in the tenons within the cylinders. This portion of the implement is intended to roll in the bottom of a trench in the surface soil, formed by another portion of the implement, presently to be described; and from what has already been said, its action will be readily understood to be precisely that of three pronged forks. The arrangement of the cylinders just now described, is one in the centre and in front, and two behind, one on each side, mounted on a suitable frame, with apparatus for raising and lowering a pair of travelling wheels, by which to raise the cylinders from the soil when being turned, or travelling when out of action; and to give power to such action there should be a swivel wheel in front to act as a fulcrum in lifting the implement. In front of the leading cylinder, should be a double-mouldboard plough-head, to open a furrow 12 inches wide, and lay the surface soil to each side, and furnished with a lifting screw to regulate the depth it may be required to be worked. Then in front of each of the other cylinders should be cylinders 12 inches long and 6 inches in diameter, on which should be spirals, slightly curved forwards, to take up and deposit the surface soil into the furrows formed by the double-mouldboard plough-head. The *helices* on the last-mentioned cylinders should be 9 inches deep, and those portions of the implement should be furnished with lifting screws to regulate their working to any less depth that may be required. These last-mentioned cylinders must have their revolving motion in the contrary direction to that of the larger or sub-soil cylinders, which may be effected by means of cross bands, from pulleys on the nave of the leading subsoil cylinder to sheaves on the axles of the two small cylinders behind.*

* The principal working portion of the implement described in the text was the invention of one Robert Hall, a shoemaker, at Prudhoe, on the south bank of the Tyne, in Northumberland, in 1822; and although but little known, it is nevertheless the best implement ever invented for the purpose. The writer has seen it worked 12 inches deep in a tilly sub-soil, below a furrow made by a common plough in the surface soil 6 inches deep, by three horses, two going in the furrow in length, and one on the unploughed ground abreast the hindmost horse in the furrow, with the most perfect effect. In returning, the common plough opens another furrow to be subsoiled, and covers with surface soil a furrow which had previously been subsoiled. So great is the effect of the operation, that the volume of the broken or forked sub-soil is so increased as nearly to fill the furrow, 6 or 7 inches deep, in the surface soil.

When the under soil may be of clay, free from stones, steam-power may be applied to draining; and with some modifications in the means to obtain a proper action, no implement appears better suited to the purpose than that described, and of which a side elevation is given in "Morton's Cyclopedia of Agriculture," vol. i. p. 707, invented by Mr. Paul, of Thorpe Abbots, near Scole, Norfolk.

Before dismissing the topics treated of in the foregoing remarks, the writer has distinctly to disclaim any original invention on his part, as there is not anything he has suggested in the present paper that is new in principle, and that has not been applied to the same purposes by the power of horse labour. With the exception of the last mentioned implement, the sources from which the different implements for the various purposes have been derived have been acknowledged in foot-notes to the text in which the description of each occurs; and the merit, if any, in the present instance is confined to designs for adapting previously well-known principles as the means of the application of steam-power to the cultivation of the soil.

If steam-power were efficiently applied to the tillage operations of agriculture, and the power and means obtained at a moderate cost in their purchase, great indeed would be the advantages, not only to those immediately concerned, but to the public at large. For not only would a cheapening of production of the fruits of the soil be a valuable result in a national point of view; but even a still more important object would be obtained from despatch, by which it would be in the power of the husbandman to choose his time for his tillage operations, which under the present system of field culture can seldom be done, as the stock of working cattle is never greater than can be fully and constantly employed all the year round; and it frequently occurs that operations commenced under favourable circumstances, as to the state of the soil, have to be continued and finished under adverse conditions, from not having an opportunity of waiting for a proper condition of the soil, without clashing with others of equal, or perhaps greater, importance.

It may be urged that the application of steam-power to the cultivation of the soil will ever be limited by particular circumstances, such as tillage farms of great extent, and flat ground. But if steam culture were successfully introduced, might not it become a profitable business to let the power and means for hire to the tenants of farms of moderate, and even small extent, as is now very commonly the practice in many districts with por-

table steam thrashing machines? And might not flat grounds be rendered so much the more productive, by improved cultivation, that the steeper grounds, whereon the difficulty of applying steam cultivation may be insurmountable, be applied to pastures? And if even a small portion of the horses now employed in agriculture could be dispensed with, by their labour being superseded by steam-power, might not a considerable amount of produce, now consumed by working stock, be available to the sustenance of man? These are questions of great importance, and deserving the consideration of all classes of the community—to the landowner, in maintaining the revenue from his estate; to the tenant farmer, in increasing his profit; to the labourer in husbandry, in increasing the comforts of life; and to all other classes of society, in the cheapening the production of the fruits of the soil. All classes of society are more or less directly interested in the promotion of the application of steam-power to the tillage and other operations of agriculture.

In conclusion, the writer has to remark that he has not been actuated in giving publicity to the foregoing suggestions from any expectation of any particular benefit to himself; but a conviction of the feasibility of his suggestions, at a cost of power and means, much less than any hitherto brought before the public, and the great national interest of so important a matter, have prompted him to publish, through the medium of the columns of a serial of such widely-extended circulation as the *Farmer's Magazine*, in the hope that by so doing it may induce others more competent to the task than himself to stimulate the attention of the ingenious and enterprising to bring to perfection an object which, notwithstanding its great national importance, has hitherto made such slow progress. It is matter to excite wonder, in this age of invention and improvement in every other department of the industry of the nation, that to that of the very first importance, steam-power should still remain so imperfect in application, especially when the advantages to be derived therefrom are so obvious, and so important to all classes of society. Should any reader, into whose hands this paper may come, desire any further information or explanation on the subjects treated of, the writer will be most happy, on application to the under-written address, to afford any that he may possess or can obtain.

51, Newgate Street, Newcastle-upon-Tyne,

August 1, 1859.

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REVIEW.

JOURNAL OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

PART 1 FOR 1859.

Under the circumstances, some reasonable allowance may be asked for the appearance at Michaelmas of the Midsummer part of the Society's *Journal*. The staff can scarcely be considered in working order; and no doubt the want of a most responsible officer, has created some difficulty and delay. But it is still a question whether the number should ever be promised much before the time at which it is now brought out. Valuable as many of the more lengthy papers and prize essays may be, the interest of this volume centres on the great Anniversary Meeting of the year. Successful exhibitors are sure to turn at once to see how they look in the Society's pages. They are naturally anxious to know what the judges and stewards or others in authority may think of them. Moreover, such a feeling is by no means confined to those who have taken an active share in the occasion. The advocates of certain breeds, and the admirers of particular strains, will be quite as curious to ascertain how they stand in the great national estimates. Readers of a more mechanical frame of mind will be yet more desirous of learning what progress has been achieved. It becomes, indeed, an absolute duty, after a three years' interval, to note the improvements made in those classes of implements that have taken their turn again for inspection. Some people have a habit of throwing their newspaper aside when once read, but so goodly a tome as the *Journal* is sure to be received with all due respect. Even beyond this there is, we repeat, an especial air of authority about it; and while we reserve the essays, and analyses, and experiments for bye-days or winter evenings, we proceed at once to refresh our memories with all that was said and done at Warwick.

Unfortunately the memories of the best of us will have still to depend on their own strength, or will not be "jogged" until we have forgotten all about it. There is no viable cause why this number of the Royal Agricultural Society's *Journal* should not have been issued a month or two earlier. It contains, to be sure, the customary ill-arranged prize lists of the Warwick show—mere formula copy, that might have been sent to the printer two or three hours after the meeting was over, or even earlier if necessary. We suppose it is useless protesting any longer against the manner in which all the commendations are huddled together; but surely the names of the successful animals might be given. A thorough-bred shorthorn is now almost as well known by his name, all the world over, as a thorough-bred horse; and yet either is carefully erased. The famous

Royal Butterfly is no better distinguished than as "Colonel Towneley's one-year-and-ten-months-old bull, bred by himself." Mr. Stratton's Matchless is "a four-year-old cow in milk," and so on. Only fancy consulting such a record as this, a few years hence, to see what the gr. gr. gr. grandam of your favourite yearling did herself at "the Royal." Or, picture a colonist showing such a satisfactory return to his friends on the arrival of the thousand guineas bull! So vague a system has really a tendency to diminish the value of prize stock.

Beyond this list there is nothing whatever on the merits of the summer show of 'fifty-nine, but a few sentences in an address from the Council. From these we gather that "the Warwick Meeting promises to be of a highly interesting character"—that "the arrangements for the Meeting are steadily progressing"—that "the entries for the implements are extremely large"—and that "the live stock portion of the show will at least be equal to any former exhibition." This satisfactory intelligence is from the report of the General Meeting in May. Report, however, of a general meeting it is not. There is not a word of the suggestions offered or observations made by the general body of the members. The whole business is confined to the usual paper drawn up, or sanctioned by the Council. At best this is scarcely respectful to a general body of members—to call them together, and then never to make a note or sign of what they say. The General Meeting on the Friday at Warwick is omitted altogether. Possibly there has not been time as yet so prepare a report of it. And we look in vain for any intimation as to a change of secretary, management of finance, or other important business that has been proceeded with this summer. Neither the stewards of stock nor of implements have anything to offer on the business of the show week; neither, most probably, will they, until time has robbed their remarks of half their use and interest.

Such criticism, it must be understood, does not apply especially to the present circumstances of the Society. We should be the first to make all proper allowance for any passing difficulty or embarrassment. We speak, rather, to a routine system that now is the very opportunity to break through. For years the reports of general meetings have been confined strictly to the reports of the Council itself. From the first, again, the prize-lists have been given without the names or any particulars of the successful animals; so that in the way of reference they are absolutely useless. There is

scarcely any animal of the three pure breeds—Short-horn, Hereford, or Devon—now exhibited at the Society's shows, but that has a name and a place in its own herd-book. It is true this was not so commonly the case when the Society was first instituted. But we must go with the times, and what might do very well in 'thirty-eight may be terribly out of date twenty years farther on. After all, the strong-hold of the Society is its great annual meeting. From the experience gathered in that week we arrive at some of our best deductions and improvements. And what we complain of is that the Show is not made enough of in the *Journal*. There should be more information upon its merits, and this should come more in the way of information—not years or half-years after it is all over. We may possibly be speaking against our own interests; but we have to furnish, in two or three days, what the Society cannot provide in two or three months.

Then, and no wonder either, the work often languishes for the lack of other matter. The *Journal* Committee is sadly put to it in the way of subjects for prizes. The Counties are gradually becoming exhausted, and a continual succession of new topics must be difficult to command; so that a good history of the Show-week, and some few particulars of the proceedings in Hanover Square, would never push more valuable material out of place. In fact, we believe such a plan would tend directly to give the open body of members a greater interest in their society, and to add something to their numbers. Two-thirds of the papers in the present part might have "stood over," without in any degree detracting from their value or effect.

About the best-timed is Mr. Algernon Clarke's prize Essay on the Application of Steam-power to the Cultivation of the Land. It is a very excellent summary, so far as it goes; but, unfortunately, can be made up no closer than to February last. Since then, as we all know, there has been a deal more doing with steam cultivation. The other prize contribution is Mr. Le Cornu's Agriculture of the Channel Islands, especially interesting for the account of the Alderney cattle. Of course the famous scale of "points" is given, and their re-appearance here should set our authorities a thinking as to whether they could not draw up some such similar a code—the twenty or thirty good points of a bull, a horse, or a sheep. Amongst the more distinguished contributors, Sir Roderick Murchison, in a short letter, dwells on the Agricultural value of certain phosphatic rocks of the Anguilla Isles; where, however, Brother Jonathan has already been before us. The Americans shipped and sold during last year only a hundred thousand pounds' worth of the rock for "regenerating the exhausted lands of Virginia." We give the paper in another column. Messrs. Lawes and Gilbert continue their valuable and standard experiments with different manures. Mr. Eddy, an M.A. of Oxford, furnishes a good suggestive paper on American Implements, and the Methods of

economizing Labour. Mr. J. C. Morton writes on the Allotment System; and M. Trebounais ably on Beet-root Distillery. Professor Voelcker estimates the value of liquid manure, and Mr. Peter Love advocates a plan of his own for applying it. Dr. Richardson, by permission of the North-Eastern Railway, details his experiments on the preservation of timber; Mr. Russell writes elaborately on the Influence of Climate on Cultivation; and Mr. Thomas Crisp shows how profitably lupine may be grown as food for sheep. Of course many of these papers will require some more careful consideration hereafter. We can only now call over the contents of a Number, that, however interesting and serviceable in its individual components, is certainly not up to the acknowledged standard of the *Society's Journal*. It is hard to see what we have been waiting so long for.

THE WILD FOWLER: A TREATISE ON ANCIENT AND MODERN WILD FOWLING, HISTORICAL AND PRACTICAL; By HENRY COLEMAN FOLKARD, Esq., Barrister-at-Law (Piper, Stephenson, and Spence, Paternoster-row).—Dr. Watts, in his masterly treatise on logic, says: "1st. Let your method be plain and familiar, beginning with things best known, and proceeding, by regular and easy steps, to your conclusion; neither hurrying from one thing to another, nor crowding too many thoughts together. 2nd. Let your method be distinct, avoid everything foreign and heterogeneous. 3rd. Include the whole of your subject, without superfluity. Express yourself clearly, and explain when necessary, but not otherwise. There is a happy medium to be observed in our method," continues the scholar, "so that the brevity may not render the sense obscure, nor the argument feeble, nor our knowledge merely superficial; and, on the other hand, that the falseness and copiousness of method may not waste the time, or fill the mind with trifles and impertinencies." Now applicable as the above is to the art of reasoning, it is equally so to the art of writing well, and Mr. Folkard has proved himself, in the work before us, pre-eminently great in the above qualities. "The Wild Fowler" cannot be called strictly a sporting volume, for it treats of much more exalted subjects than the mere capture of these aquatic birds. Thus we find, among its interesting details, bibliothecal researches, Egyptian fowling, and natural history of wild-fowl, wild geese (bernicle, bean, and solan), heron, plover, coot, moor-hen, snipe, curlew, dotterel, ruffs and reeves, and other birds; habits of the Greek and Anglo-Saxon fowlers; Russian, Persian, American, Indian, French, and English methods of capturing wild geese. The whole, too, is interspersed with clever anecdotes, practical advice, and sage counsel, that render the volume as useful as it is entertaining. The author writes with great spirit and great power. Following the observation of the surly pedant, Dr. Johnson, "That human experience is the great test of truth," he details facts which have come under his immediate knowledge. His research is profound: his style, always original, varies according to the voluminous subjects upon which he treats—now simple, easy, and distinct, now glowing, elevated, and dignified, avoiding those rocks which

so many authors have foundered upon, by rendering themselves unintelligible, through an affectation of curtness or sublimity, whose sentences, with a view to their being pointed, are too short to be explicit, and whose flowing style is rendered ridiculous by obscure and unmeaning figures, which are "great swelling words of vanity." If the first object of writing be information, its first quality is perspicuity to write so as not merely to be understood, but as leaving no danger of being misunderstood. The work before us is beautifully got up, both as to literary matter, type, paper, binding, and illustrations. It contains thirteen most artistic engravings on steel, and five spirited woodcuts, reflecting alike the greatest credit upon the young rising barrister, who, we trust, in due course of time will prove himself as worthy the exalted position that a brother sportsman, the Lord Chief Justice of the Queen's Bench, now holds with such honour to himself; to the artists, Messrs. Armfield, R. Ansdell, Beckwith, A. Cooper, and the author, who furnishes five drawings, a vignette, and, we presume, the woodcuts; to Messrs. Piper, Stephenson, and Spence, for their discernment in publishing this standard work; and last, not least, to the printers, Messrs. Rogerson and Tuxford, for the faultless manner in which the typographical part is executed.—*The Review*, September 10.

COMMERCIAL AND AGRICULTURAL VALUE OF CERTAIN PHOSPHATIC ROCKS OF THE ANGUILLA ISLES IN THE LEEWARD ISLANDS.

By Sir RODERICK IMPEY MURCHISON, V.P.R.S.,

Director-General of the Geological Survey, and Honorary
Member of the Royal Agricultural Society.

(From the *Journal of the Royal Agricultural Society of
England*.)

Having long been an Honorary Member of the Royal Agricultural Society of Great Britain, I have often regretted that I have never had it in my power to communicate anything of importance to the British farmer.

I am now, however, enabled to make an announcement which will, I have no doubt, be as acceptable to the readers of the "Agricultural Journal" as it is interesting to the geographer and geologist, whilst it is likely to become very valuable to the merchant and shipowner.

A few weeks ago my eminent friend Sir William Hooker enclosed to me a letter from His Excellency Mr. Hercules Robinson, recently Governor of St. Kitts, in the Leeward Islands, and now appointed Governor of Hong Kong, accompanying a box of specimens of rocks taken from three localities in the Anguilla Isles, lying immediately to the north of St. Kitts, and requesting me to have the specimens analysed in the laboratory of the School of Mines under my direction.

It appears that the Americans, in the course of the year 1858, quarried away some 30,000 tons of rock, the greater part of an islet called Sombbrero, to the north of the Anguillas, and sold the substance in the New York market at prices from £3 10s. to £6 10s. per ton, to the amount of £100,000, for the purpose, it is said, of regenerating the exhausted lands of Virginia. Subsequently the inhabitants of the Anguillas, knowing that some of their northern "keys" or rocky islets

were similar in aspect to Sombbrero, naturally desired to have these substances analysed.

The analyses have been made by Mr. Charles Tookey in the laboratory of this establishment, under the direction of Dr. Percy, and are as follows:—

Little Anguilla.—The specimens from this islet do not contain a notable amount of phosphoric acid.

Little Scrub.—This sample contains 1.62 per cent. of phosphoric acid or 3.53 per cent. of phosphate of lime; but certain porous portions selected from the mass gave 25.75 per cent. of phosphoric acid or 56.21 of phosphate of lime. The porous portion of the *Little Scrub* rock contains also nitrogenous organic matter, and a trace of potash.

Blowing Rock.—This sample contains 0.31 per cent. only of phosphoric acid or 0.68 per cent. of phosphate of lime.

The specimens sent home from the Sombbrero Rock contain respectively—solid rock, 36.71 per cent. of phosphoric acid or 80.14 of phosphate of lime. The porous portion of the rock yielded 32.37 per cent. of phosphoric acid or 70.67 of phosphate of lime.

Now, although these specimens are much richer than those transmitted from the Anguillas, it is to be recollected that the former were taken from the heart of the rock; the Americans having cleared away all the overlying portions, even to the water's edge. On the other hand, the British specimens were merely gathered from the surface; and it is therefore probable that, when deeply quarried into, some of our "keys" may prove as valuable as the Sombbrero Rock.

We have yet to learn to what extent other rocks of the Anguilla Isles may be of as good a quality as those of the "Little Scrub," but even if it be found that Anguilla, the chief island of the group, which is 20 miles long by 6 miles broad, does not contain any considerable quantity of this peculiar breccia, still the islets lying between it and the rock of Sombbrero may be of considerable value. For, if substances similar to the breccia of the "Little Scrub"—which has all the external character of a bone breccia—shall be found to occupy several of these islets, the discovery must be considered one of great national importance, in providing our agriculturists, from a British possession, with a plentiful supply of a good substitute for the guano of Peru.

I trust, then, that Her Majesty's Government may deem it expedient to send out a competent geologist, or may direct one of the two geologists now surveying in the West Indies, to explore the "keys" and rocks at Anguilla, and define the extent over which these phosphatic substances may be distributed.

*Museum of Practical Geology and Government
School of Mines, Jermyn-street, May 30.*

FOREST LEAVES, SAWDUST, AND HUMUS.

We consider the value of forest leaves as a manure a fact too well established to need any comment, and can only express surprise that they should be so generally neglected by those who can obtain them with no expense but that of gathering and removing them to a place of deposit, where they can be either used to compost with stable manures, or decomposed sufficiently for application by themselves. This last is seldom done, as, when once obtained, most persons prefer to use them in their barn-yards and cattle-sheds where they are useful as an absorbent of the liquid excrements. When they are composted in a heap by themselves

it will cause a more immediate decomposition to use ashes, soot, or marl in alternate layers with the leaves, as these substances will cut them up fine, and have an effect to correct any undue amount of acidity, which often occurs in speedy fermentations of this character. But we have never known of an instance where this mode of operation would prove half so valuable as that of using them in the barn-yard with animal excrements.

This method not only preserves all the most important elements of the leaves, but possesses the advantage of improving the quantity of barn yard manures, without diminishing, in the slightest perceptible degree, their quality, as they retain many liquids and gases which would otherwise be lost, and prevent much unnecessary decomposition.

The value of the leaves of different trees vary very much in quality, as those obtained from oaks and other hard woods are the most valuable, those from pines being the poorest, and, indeed, they are hardly worth preserving, as they contain a large per-centage of acidity, which has to be neutralized by alkali before they can be used.

It will also pay to collect the top formation of wood mould, which is always mixed with moss and old rotten trunks and limbs. These little matters, although small when viewed singly, are of real importance, and will be valuable additions to the compost heap. This decayed vegetable mould contains all the elements of re-production, and it is supplied to the plant in the best of all for its ready assimilation.

Sawdust is the particles of wood which is reduced to fineness by the use of the saw in preparing marketable lumber. It can be obtained in large quantities from saw-mills, where it is usually regarded as a nuisance, and is frequently dumped into the stream as an article of no value. Of late, however, it has been considerably prized for packing ice, which has somewhat enhanced its importance. Most of our inland farmers who burn wood make quite a little pile of it in the course of the year, when all carefully saved, as it always should be, together with the chip dirt which gradually gathers around the wood pile.

The decay of sawdust or woody fibre changes it into what is usually called humus, or vegetable mould. This last term, however, is mostly applied to these decayed substances when they are mixed with earth. Ordinarily, woody fibre is a long time in dissolving itself into humus; but this decomposition is much more easily achieved by an elevated temperature, and the free access of air. Moisture and the application of alkalis also accelerate the decomposition, but acids have the contrary effect, and greatly retard any decay. "For the purpose of fuel, decayed or diseased wood is of little value, for it does not possess the property of burning with flame—a property upon which the advantages of common wood depend. The hydrogen of decayed wood must consequently be supposed to be in the state of water." Humus is increased in value by its contents of ashes, which are considerable; but irrespective of this, its intrinsic value as a manure is very considerable. By its decay it produces carbonic acid and water, which feeds and moistens the soil, and absorbs nitrogen from the air, which is converted into ammonia and nitric acid to fertilize the plant. Again, it increases the warmth, porosity, and friability of the soil; acting on the otherwise insoluble minerals, it renders them soluble, and fits them for immediate food for the plant. Hence, by its various and manifold action, humus possesses no mean quality as a manure. After the application of sawdust to the land, it naturally decomposes, and thus becomes valuable as humus, while before its application it may have been used as an absorbent,

in which case its value will be two-fold. For littering stables, hog-styes, hen-houses, and other similar places, it is very useful, as it not only retains much more of the liquid excrements than the straw, but is easier carried about, and takes up less room. Sawdust, when left in heaps, often heats and ferments, which causes an acidity to the whole mass; this should be neutralized by mixing lime or some other alkali with it.—G. T. H. in the *Country Gentleman*.

PRESENTATION TO MR. HENRY AMBLER, OF WATKINSON HALL, HALIFAX.—At the recent show of the Halifax and Calder Vale Agricultural Association, the members presented their vice-president, the well-known Mr. Henry Ambler, with his portrait. In doing this on the part of the meeting, Major Edwards, the chairman, thus spoke to the merits of their friend and neighbour: "The great event connected with that anniversary of their association was to congratulate their worthy vice-president, Mr. Ambler, on the honourable position in which he was placed. They were met to commemorate the worth and talent of a man who had so largely contributed to the success, to the celebrity, he might add, of the association, by introducing his excellent breed of Shorthorns. He had done more to promote its prosperity than any other member. Mr. Ambler was also a manufacturer, and though he had not neglected his own business, being shrewd enough for that, yet he had found time to occupy his leisure hours in another pursuit with honour to himself and advantage to his neighbours. When they considered the number of prizes he had carried away in the southern district, —not second prizes in silver, but first prizes in gold,—also from almost every county in the south of England; and when, as a romantic friend of his (the chairman) remarked, he had been the first to invade the regions devoted solely to agriculture and cattle breeding, and carry away the trophies which had for many years been appropriated by agriculturists, no manufacturer daring to oppose them, he took his Shorthorns to win these prizes, and gained the laurels which now adorned his brow; thereby raising the credit of the association, and enhancing his own in the same proportion. Such men were an honour to the association. The name of Henry Ambler would ring for years amongst them, and the echoes would resound all over the district; for what part of the district was there that had not been benefited by Mr. Ambler's genius and industry? His "Grand Turk" had done wonders, and Mr. Ambler was himself the Grand Turk of that evening, as he was of the Calder Vale Agricultural Association, and he should always acknowledge him as such. The Association had placed him as their Chairman, in an enviable position, having appointed him as their mouth-piece, to present to his good friend the portrait of himself, to be handed down from generation to generation, as a token of the regard and attachment, the admiration and esteem of his friends the members of the association." Mr. Ambler made an appropriate but brief response. The picture bore the following inscription: "Presented to Henry Ambler, Esq., of Watkinson Hall, by a number of his friends, as a mark of their high regard and esteem for his private worth, in testimony of their warm appreciation of his great zeal in promoting the prosperity of the Halifax and Calder Vale Agricultural Association, and in expression of their admiration of his indomitable perseverance and great skill in raising himself to such an eminent position amongst the foremost breeders of short-horned cattle in this or any country."—August 27th, 1859."

CLEVELAND AGRICULTURAL SOCIETY.

The following is a list of prizes awarded at this show for HORSES:

Best Cleveland bay brood mare, £7, to Mr. J. Smith, Long Newton; second, £3, to the Guisbrough Alum Company, for Trimmer.

Coaching brood mare, £7, to Mr. T. Wilson, Mount Grace, Northallerton, for Blink Bonny, who often obtained the president's prize of the silver cup; second, £3, to Mr. G. Holmes, Beverley.

Hunting brood mare, £7, to Mr. R. G. Mewburn, Ingleby Barwick, Yarm; second, £3, to Mr. Reed, Stockton.

Draught brood mare, £7, to Mr. J. Turner, Thornton-le-Beans; second, £3, to Mr. T. Upton, Pallathorpe, Tadcaster, for Mettle.

Roadster brood mare, £5, to Mr. H. R. W. Hart, Dunnington Lodge, York, for Maid of All Work, being the twelfth prize which this animal has obtained; second, £1, to Mr. J. Emerson, Eastby Hall, Stokesley, for Nancy.

Foal of the Cleveland bay breed, £3, to Mr. J. Wood, Skelton; second, £2, to Mr. J. Robinson, Rudby; third, £1, to Mr. W. Foster, Lealholme, Whitby.

Coaching foal, £3, to Mr. T. J. Peart, Great Ayton; second, £2, to Mr. J. Fletcher, Little Ayton; third, £1, to Mr. J. Robinson, Rudby.

Hunting foal, £3, to Mr. J. F. Ellerby, Nunthorpe; second, £2, to Mr. H. W. Thomas, Pinchinthorpe House; third, £1, to Mr. T. Bainbridge, Marake.

Draught foal, £3, to Mrs. Mary Kitchen, Whorlton; second, £2, to Mr. J. Turner, Thornton-le-Beans; third, £1, to Mr. T. Laing, Lackenby.

Reader foal, £3, to Mr. J. H. Handyside, Stokesley; second, £2, to Mr. H. R. W. Hart, Dunnington Lodge, York; third, £1, to Mr. T. Eaton, Tockets, Guisbrough.

Two year old Cleveland bay filly, £3, to Mr. T. Ward, Bannial Flat, Whitby.

Yearling Cleveland bay filly, £2, to Mr. J. Sayer, Great Ayton.

Three years old coaching gelding, £4, to Mr. J. Lilburn, Rounton.

Two years old coaching gelding, £3, to Mr. G. Nellist, Thickley, Shildon.

Yearling coaching gelding, £2, to Mr. J. Binks, Newton-le-Willows, Bedale.

Coaching filly not more than three years old, £3, to Mr. W. Motherall, Brockholme, Northallerton.

Three years old hunting gelding, £4, to Mr. J. Jackson, Tunstall, Catterick.

Two years old hunting gelding, £3, to Mr. G. Carrick, Pinchinthorpe.

Yearling hunting gelding, £2, to Mr. G. Holmes, Beverley.

Three years old hunting filly, £3, to Mr. R. Hymers, Great Ayton, for Ruth.

Two years old hunting filly, £2, to Mr. J. Pressick, Loft-house.

Yearling hunting filly, £2, to Mr. R. Hymers.

Three years old draught gelding or filly, £4, to Mr. W. Gofton, Pockthorpe, Driffield; second, £1, to Mr. T. Upton, Pallathorpe, Tadcaster, for Drummer.

Two years old draught gelding or filly, £3, to Mr. T. Upton, for Captain.

Roadster, gelding or filly, not more than three years old, £2, to Mr. W. Proude, Bishop Middleham; second, £1, to Mr. J. Atkinson, Belasis.

Pony of any age, not exceeding 13 hands, £2, to Mr. J. Proude, Yearby, for Jessy; second, £1, to Mr. W. Hall, Fleece Hotel, Thirsk.

EXTRA STOCK.—A silver medal was awarded to Mr. H. Wilson, Barnaby, for a bay hunting mare.

SPECIAL PRIZES.

(Offered from a fund supported by private subscription.)

Hunter, mare or gelding, from four to nine years old, warranted sound, £20, to Mr. T. Parrington, Normanby, for King Charming; second, £7, to Mr. G. Holmes, Beverley; third, £3, to Mr. W. Proude, Bishop Middleham.

A silver-mounted hunting whip was awarded to Mr.

Parrington, the secretary, as the rider who rode his horse over the leaps in the most skilful and sportsman-like manner.

Hackney gelding, from four to nine years old, and warranted sound, £5, to Mr. T. Garbutt, Yarm, for Rugby.

Hackney mare, from four to nine years old, and warranted sound, £5, to Mr. T. Parke, Pickering.

The Society's silver medal to the best animal in the show was awarded to Mr. Parrington, for his horse King Charming.

GREAT ANNUAL SHOW OF TUPS AT KELSO, FOR PREMIUMS AND FOR SALE.

This annual meeting, now so celebrated throughout the whole country, was held on the usual show-ground early in September. To judge from appearances this market is becoming every year of greater importance to breeders, and is more and more resorted to by those in search of superior Leicester rams, as the only place in the kingdom where so great a choice is to be met with.

SHOW FOR PREMIUMS.

The business of the day commenced with the competition of sheep for the premiums offered by the Union Agricultural Society, and by the Highland and Agricultural Society of Scotland. We have seen the entries for those premiums more numerous in some of the classes, but we believe the quality of the stock exhibited was fully equal to that of any former years. The judges who acted on the occasion were Mr. Wilson, Edington Mains; Mr. Smith, East Learmouth; and Mr. John Chrisp, Hawkhill, for the Leicesters; and Mr. Henderson, Langleyford; Mr. Clay, Winfield; and Mr. Douglas, Nortonhall, for the Cheviots; who gave in the following awards:—

Union Society's Premiums.

CLASS I.—LEICESTER SHEEP.

Best Shearling Tup—Mr. Simson, Blainie, 51.

Best two-shear Tup—1, Lord Polwarth, 31. (His Lordship bought this tup from the flock of Mr. Cockburn, Slaterspath.) 2, Mr. Stark, Mellendean, 21.

Best pen of five Leicester Gimmers or Shearling Ewes—Mr. Roy, of Nenthorn, 31.

CLASS II.—CHEVIOT SHEEP.

Best two Tups, not above once shorn—Mr. Elliot, Hindhope, 51.

Best Tup, not above thrice shorn—1, Mr. Elliot, 31; 2, Mr. Elliot, 21.

Best pen of ten Gimmers—Mr. Elliot, 31.

Premiums given by the Highland and Agricultural Society of Scotland to the district comprehending the counties of Berwick and Roxburgh.

LEICESTER SHEEP.

Best Tup belonging to a Proprietor or Factor—Rev. R. W. Bosanquet, Rock, the Society's Silver Medal.

Best Tup of any age—no competition.

Best two Shearling Tups—Mr. Simson, Blainie, 51.

Best pen of five Ewes, not less than two shear—Mr. Stark, Mellendean, 51.

Best pen of five Gimmers or Shearling Ewes—Mr. Simson, Courthill, 41.

THE SALE OF RAMS.

The great business of the day was the sale of Leicester rams. The number entered for public auction amounted to 1,518—of which 681 were in the ring presided over by Mr. Fairbairn, auctioneer, Kelso; 467 in that presided over by Mr. Donkin, auctioneer, Bywell; and 370 in that of Mr. Embleton, auctioneer, Broomhouse, and Mr. Oliver, auctioneer, Hawick. The sales commenced very soon after nine o'clock, and continued without intermission until the whole were disposed of, and so great was the number of purchasers in attendance, that not a single sheep was taken back unsold. It was the briskest sale we have yet had at this

meeting, and prices generally were considerably higher than those of last year, ranging from £3 to £36 a-head; the latter price being reached by one of Lord Polwarth's sheep. When Mr. Fairbairn got through his large lot, the bidders were as prompt as ever; in short, towards the end of the day prices were rather improving, thus showing that great as the number of sheep was it was not equal to the demand. Mr. Fairbairn finished his lot soon after five o'clock, and in a very short time afterwards the show-ground was completely cleared. We may safely affirm that this market for Leicester rams is unequalled in any part of the kingdom, and consequently the attendance of purchasers from all quarters is most numerous; otherwise it would be impossible to dispose of so large a lot. There was a great attendance of company throughout the day. We subjoin the average prices of each lot so far as we have been able to procure them, which will give an idea of the prices obtained:

No.	Name.	Average.
of Tups.		
44	Right Hon. Lord Polwarth ..	£11 4 0
50	Mr. Stark, Mellenes ..	12 14 8
40	Mr. Thomas, Rutherford ..	6 0 0
40	Mr. Roy, Nenthorn ..	5 10 0
8	Mr. Ingram, Copeland ..	4 1 6
34	Mr. Lynn, Mindrum Mill ..	4 8 6
6	Mr. Ruddick, Berwick, 1st lot ..	5 0 10
14	Do., Do., 2d lot ..	9 17 1½
26	Mr. Hutchinson, Redden ..	4 5 9½
22	Mr. Nevins, Marldown ..	5 17 4½
85	Mr. Laing, Cornhill ..	4 12 9½
21	Mr. Pinkerton, Ancroft Steads ..	5 3 9½
80	Mr. Purves, Linton Burnfoot ..	8 4 6
50	Mr. Nisbet, of Lambden ..	6 17 4
52	Mr. Thomson, Mindrum ..	5 17 9½
36	Mr. Cockburn, Sisterpath ..	10 12 2
50	Mr. Simpson, Courthill ..	7 11 8
65	Mr. Robeson, Springwells ..	6 6 2
90	Trustees of late Mr. Hogarth ..	4 18 9½
24	Mr. Wellbank, Keighley ..	4 7 3½
26	Mr. Wilson, Haymount ..	5 0 6
20	Mr. Logan, Humehall ..	4 17 4
14	Mr. Hannam, Kirk Deighton ..	3 11 5
44	Mr. Robertson, Harpetoun ..	3 13 0
35	Mr. Oliver, of Lochide ..	3 13 6
24	Mr. Cunningham, Grahamslaw ..	4 15 7
15	Mr. Nisbet, Elwick (long wools) ..	5 3 0
19	Mr. Peake, Craigend (half-bred) ..	6 6 6
17	Mr. Elliot, Hindhope (Cheviot ewes and gimmers) ..	2 14 6

The number of tups sold by Mr. Fairbairn was 670, and the average of the whole was £6 1s. 2½d.

SALE OF MR. BEALE BROWNE'S FLOCK OF COTSWOLDS.

There was a great gathering on the Cotswolds on Tuesday, Sept. 6, on the occasion of the sale of Mr. Beale Browne's celebrated flock of Cotswold sheep. The company assembled at Hampden was a congress of the agriculturists of England. They came from the heavy soils of Essex, the red earths of Northampton, and that great *omnium gatherum* of soils Lincolnshire; from the fertile valleys and wide chalk downs of Wilts, and the garden county of Monmouth; from the great pasture farm of Leicestershire, whose farmers still affect to be *nonpareil*; from the bluff headlands of Pembroke in the west, and from the holms of Northumberland, and as far as the Cheviots in the north. Ireland, America, and Australia also had their representatives there. Never before, perhaps, have the Cotswold sheep held so brilliant an "at home." Lunch preceded the business of the day, and the customers were early in the field, fearing, probably, they might lose some good thing, and many spent the morning in surveying and comparing the stock, and finding those which took their eye. The sheep did not look so well as they might have done, owing to the rain which fell during the morning, but even in their wet coats they were something worth talking about. Great rams, tall enough to look over a hurdle, with backs broad enough to dine upon, and breasts like the bow of

a jolly-boat, to which the whole animal bore no bad resemblance in outline; and then they were curled like the darlings of a drawing-room; and indeed we suspect that ere this some of them have been shown on the carpet. Then there was the produce of these patriarchs of the hills, inheriting much of their excellence, as we may judge from the prices which they commanded. The sheep having been disposed of, the auctioneer (Mr. Villar, of Cheltenham) offered a small but fine herd of cattle. The prices obtained were considered on the whole exceedingly good, and averaged the turn over £4 per head for everything sold. The best price given for rams was 18 guineas. Mr. Browne has retained ten of his best white-faced rams, and intends to maintain a flock of white-faced sheep, that is, if an improvement in the health of his family should give him time and opportunity.—*Abridged from the Gloucester Chronicle.*

THE BISCATHORPE RAMS.—The annual letting of the Biscathorpe long-wool rams took place on Thursday the 1st Sept., on which occasion Mr. Kirkham was honoured with the presence—and with the biddings as well—of a much more numerous company of gentlemen interested in the breeding and letting of sheep than, we believe, has ever surrounded him before. The fame of Mr. Kirkham's flock has for some years attracted a great number of strangers from distant parts of the country, but this year not only were almost—if not entirely—all his old patrons present at the letting, but there was also a considerable addition of gentlemen who for the first time saw the splendid flock, or partook of the munificent hospitality of its proprietor. In both respects, it was the general opinion that Biscathorpe on that day surpassed itself; for after having looked upon and handled some of the finest rams, the shearlings especially, that have ever been sent from Biscathorpe, the company, almost two hundred in number, sat down to an entertainment of an equally super-excellent character. The comforts and decorations of the room, and the quantity and quality of the wines and refreshments, were something to be admired and surprised at, as well as to be enjoyed. When three o'clock, the hour for letting, arrived, the company at once proceeded to the auctioneer's stand, which was occupied, as usual, by Mr. D. Briggs. The sale on the whole was an extraordinarily good one, for in about three hours 124 rams were let for the sum of £1835. The 64 shearlings, which were the theme of general admiration for size, symmetry, and covering, fetched £686 10s. A shearing almost perfect in every respect was let to Mr. Kirby for £50, and a very superior sheep was secured by Mr. Minto for £36: several more of the shearlings reached £30. But the most animated and vigorous competition took place over a most magnificent two shear sheep, which may have been equalled before for all the sterling qualities required in a ram, but which it would be almost impossible to surpass. If ever a ram came up to the ideal of a rigid sheep breeder's imagination it must have been that ram, for both in proportion and outline it was almost faultless. After a very brisk bidding, it was knocked down to Mr. Caswell, of Laughton, for £80. It would have fetched £100 had not the competition been generously relinquished by Mr. Kirkham sen. This is the seventh year that Mr. Kirkham has held a public letting, the rams having previously been let by private contract. The averages for the last six years have been as follows:—1853, £11 7s.; 1854, £12 8s.; 1855, £11 3s.; 1856, £11 14s.; 1857, £11 17s. 10d.; 1858, £11 9s. 4d. This year the averages were—for shearlings, £15 4s. 8d.; two shear, £15 2s. 4d.; three shear and upwards, £12 16s. 11d., or an average throughout of upwards of £14 4s.

MR. RIGDEN'S SALE AT HOVE.—Friday, Sept. 9, this important sale of Southdown sheep took place at Hove, Mr. Bushby officiating as auctioneer on the occasion. After an excellent luncheon, Mr. Bushby commenced the business of the day, advertising to the eminent success which had attended Mr. Rigden in his efforts to maintain the superiority of the Southdown sheep over all other breeds, which had been evidenced for a number of years at the great national exhibitions, where he had carried off the leading prizes in all the different classes. He was aware that before such an audience as the present any encomiums from him would be quite unnecessary, and he confidently appealed to them to support the enterprise manifested by one of their own body—a tenant farmer. After

some other observations, he proceeded to submit the various lots, which realized the following prices:—Full-mouthed ewes: Lot 1, 9s. 6d., Mr. Stenning. Lot 2, 9s. 6d., Mr. Drury. Lot 3, 10s., Mr. Hills. Lot 4, 7s. 6d., Mr. Drury. Lot 5, 5s. 6d., Mr. Dell. Lot 6, 8s., Mr. Hills. Lot 7, 5s., Mr. Selby. Lot 8, 50s., Mr. Hart. Lot 9, 52s. 6d., Mr. Hills. Lot 10, 42s., Mr. Hart. Shearling ewes: Lot 11, 60s., Mr. Woodhouse. Lot 12, 72s. 6d., ditto. Lot 13, 47s. 6d., Mr. Drury. Lot 14, 45s., ditto. Lot 15, 46s., Mr. Waters. Lot 16, 42s., Mr. Hall. The ewes, therefore, obtained an average of 58s. 1d. We may add that the flock was in excellent condition, proving the very superior management of the owner during a very trying season. Rams for letting: No. 1, 5 years old, by Windsor Castle, was let to Mr. Hills for 40gs. No. 3, 3 years old, by Son of Favourite, to the Hon. H. Brand, M.P., for 17gs. No. 4, 2 years old, by Young Favourite, for 46gs., to Mr. Hills. No. 5, 2 years old, by Young Favourite, 31gs., to Mr. J. Waters. No. 6, 2 years old, by Young Favourite, 18gs., to Mr. Sharpe. No. 8, 2 years old, by Son of the Duke, 11gs., to Mr. Reid. No. 12, 1 year, by The Duke, 15gs., to Mr. Treherne. No. 13, 1 year, ditto, 30gs., to Lord Chichester. No. 14, 1 year, by ditto, 26gs., Lord Walsingham. No. 15, 1 year, by Son of Favourite 21gs., to Mr. Drury. No. 19, 1 year, by The Duke, 11gs., to Col. Paine. No. 27, 1 year, by Son of Favourite, 11gs., to Mr. Sharp. Rams for sale: No. 7, 2 years, by Carlisle, 10gs., to Mr. Brand. No. 20, 1 year, by The Duke, 10gs., Col. Paine. No. 26, 1 year, by The Duke, 11gs., to Mr. Carruthers. No. 28, 1 year, by Son of Favourite, 12gs., to Mr. Hills. No. 29, 1 year, ditto, 12gs., to Mr. Tipping, Braisted Park. No. 30, ditto, 11gs., Mr. Hall, who also purchased 32, at 10gs.

MR. ADNEY'S SHROPSHIRE SHEEP.—An important sale of pure bred Shropshire sheep took place at Harley, Salop, on Tuesday, Sept. 13, and when we say that upwards of 800 gentlemen partook of a sumptuous luncheon, well supplied with wine and other beverages, it may give some idea of the gathering. Competition was keen, and large prices easily realized. Rams made from 15 to 95 guineas; ewes from 4 to 8 guineas; heaves from 3 to 5 guineas; ram lambs from 8 to 22 guineas; ewe lambs from 2 to 2½ guineas each. Buyers from Ireland, and exporters to Australia, France, and other countries thronged the arena. The sale was conducted in Mr. Preece's usual able manner.

WALSOKEN, NORFOLK.—The long-wool rams the property of Mr. Ollard were let by auction on Wednesday, Sept. 14, by Mr. Cross. The company numbered from sixty to seventy gentlemen from the neighbouring counties, among whom we observed Richard Young, Esq., Mayor of Wisbech, in the chair; K. Viall, Esq., Stoke, Essex; T. Pratt, Esq., Sudbury; T. Payne, Esq., Stoke; — Pratt, Esq., Paston, Peterborough; — Sartoris, Esq., Rushden Hall, Northamptonshire; Messrs. King and Coales, of Long Stanton, Cambridge; Messrs. Spencer, Allett, Bailey, Mattley, Griffin, and D. Grounds, of Eldernell; Mr. Martin, of Littleport; Mr. Kilham, of Tid; Messrs. Marriott and Masters, of Lynn; and Messrs. Louth, Healey, and Goward, jun., of Wisbech. After a spirited competition, the greater part of the sheep offered were let at prices from £5 10s. to £32 10s., several of the sheep making from £12 to £20. These sheep are now ranked amongst the first of their breed; and Mr. Ollard, after nearly thirty years, has acquired a fame and celebrity hitherto unknown in this neighbourhood.

SALES OF TUPS IN ARGYLLSHIRE.—Mr. Stewart of Coll's annual sale of tups took place at Tomaig, on Wednesday, Sept. 14. About 30 shearlings were disposed of at prices ranging from £9 each and under, and 10 aged tups, some of which realized from £5 to £8, but most of these went for less than that sum. At same time and place, Mr. Donald McDonald, Arinascavich, &c., &c., disposed of a number of his tups, mostly bred from Mr. Stewart's stock, at excellent prices, one having fetched as high as £20, the others at sums varying £5 and under.—The annual sale of Mr. Robert Stewart's blackfaced tups took place at Drumore, on Thursday the 8th instant, when Mr. Dickson disposed of 60 yearling and 6 aged tups. The yearlings were all bred on the farm of High Loosit. The day was fine and the attendance was large. The highest price realised for a ram was £17 15s., purchased by Mr.

Archibald for his Grace the Duke of Hamilton. The next price was £15, bought by Mr. D. McDonald, Arinascavich. The next price realized was £13 9s., bought by Mr. J. McIntyre, for Allan, Pollock, Esq. Other rams realised respectively: £11 (a two-year-old), £10 12s., £9, £8 4s., £7 4s., £6 7s., £5—these being the top prices. The other lots sold at various prices down to about £2. A few Leicester tups were disposed of at prices from £4 11s. to £3 each, and a few shot ewe lambs at 10s. 9d. each.

SHROPSHIRE SHEEP.—The last great sale of the season took place at the Flash on Tuesday, Sept. 13. Mr. Preece on this occasion represented several most noted sheep breeders. Upwards of 190 rams and 800 ewes, from the flocks of Messrs. Lee, Pembury, Claridge, Henry Smith, Maddocks, Farmer, Stanier, Evans, Crane, Mansel, Tompkins, Plimley, John Freese, and other noted breeders, were sold, the rams making upwards of 13 guineas and the ewes 3 guineas each. Purchasers from all parts of the kingdom were present, and pronounced the show of animals unexcelled by any previous collection, either in that or other counties.

DOGDYKE RAM SHOW.—This justly-celebrated flock, belonging to Mr. James Mayfield, was offered to the public on the 8th Sept. The numerous assemblage consisted of eminent breeders, graziers, and the gentry of this and the surrounding counties; and unanimous was the opinion of persons, upon whose judgment we can rely, that a flock characterizing all important essentials it had not been their lot previously to have witnessed. After a bountiful *déjeuner*, served up in first-rate style, and consisting of everything in season, the rams were submitted for competition, and so spirited was the bidding, that several of the young sheep realised from £20 to £56, and many of the old ones from £12 to £52. The average of the shearlings was £12, and that of the two years nearly £9. The day was one of business and of pleasure, and many and fervent were the expressions of gratitude to the aged and hospitable proprietor of the Dogdyke rams.

RAM LETTINGS IN THE EASTERN COUNTIES.—Several important ram lettings and exhibitions have taken place in the eastern district during the last month. At Mr. Bennett's gathering at the Trinity College Farm, Cambridge, the prices obtained ranged from £6 6s. to £21; but the company was scarcely numerous enough. At Mr. P. J. Sharman's meeting at the Park Farm, Scarning, Norfolk, there was some spirited bidding, 45 lambs being let at an average of £4 6s. 6d. each, while the highest price realized was £9 15s.; 25 shearlings realised an average of £8 8s.; and the two-shears and the remainder of the shearlings £6 6s. each. Two of the shearlings were hired for Lord Stafford at 30 guineas.

FRAUDS IN THE FOREIGN CORN TRADE.

[FROM A CORRESPONDENT.]

The frauds practised by shippers of corn at various ports on the continent are now of such magnitude as to demand that the various associations in Great Britain connected with the trade should adopt an immediate and effective remedy. The facts are generally of this colour: A shipping firm at a continental port send samples to one in England, with, amongst other conditions, one, that the buyer shall pay for cargo before he sees it, as also that the bulk shall be equal to sample. On arrival the bulk is not equal but inferior to sample; and the writer knows of one firm who has in consequence of this shortcoming by a Nantes house (which port is becoming notorious for such practices) claimed £1,200 from them. He has only one remedy in England—to attach any monies the foreign house may have in the charge of English firms. This can seldom be done, consequently the buyers are (if the sellers prove obstinate or dishonest) obliged to resort to the courts of law at the port of shipment. Such is often a disagreeable alternative, as the following will show—the facts are well known in Liverpool. A firm there received in the spring of 1858 a sample; and a purchase was concluded with a firm at Nantes with the distinct understanding that the bulk was to be equal to sample. The vessel arrives, lands her cargo, and, fortunately for the buyer is received by the Mersey dock and harbour board officials.

During discharge, the buyers, finding the cargo to be inferior to representation—say, about 30 per cent.—instruct the dock officials to retain it, so that the reader will see it could not be tampered with by the consignee. The usual affidavits and declarations were made; the shippers scouted them, and still do so, notwithstanding the tribunal of commerce at the shipping port decreed that the English buyers were entitled to relief, and the superior court at Rennes confirmed this decision, and directed the tribunal to say to what extent of relief the English buyers are entitled. The vessel arrived in March, 1858, proceedings were commenced in June, and they are not yet closed, and the goods are unsold. So much for foreign law courts. It is the plain duty of the various corn exchange associations at our several ports to immediately tackle these foreign firms.

THE VIEW TAKEN BY THE SHIPPING INTEREST OF THE SUPPLY, DEMAND, PRICES, &c., IN THE CORN TRADE FOR 1859-60.

Of late years it has become, so to speak, the fashion for the English growers to contend that they have produced very little wheat, even upon the best soils, and that the stocks of old grain at this particular period are nearly exhausted. This, we find, the cry this season; but a very little inquiry into the truth of statements published evidently to suit the views of interested parties has convinced us that agricultural authorities are much at sea in a matter of truly national importance. For who, we ask, is not interested in the produce of the soil? The large consumers are interested in abundance and a low price. The carrying trade of the country is interested to an extent which exceeds, by comparison, most former periods of our history; and the foreign producers naturally look to England as an outlet—and that, too, a ready-money one—for their surplus produce. Our object on the present occasion is not to distort particular views, but to offer such practical observations as will be found essentially useful to the general community. First, as regards the crop of wheat in England. Owing to the heavy storms which prevailed in July, a portion of it has been secured in comparatively poor condition. Smutty and sprouted wheats are to be met with in some quarters, but our firm impression is that the total produce is quite equal to 1858 as to quantity. Again, the bulk of straw grown this year is considerably in excess of most former periods. It follows, therefore, that, with the exception of quality, the yield of wheat is a full average one. This observation extends not to any particular county, but to the whole of England. Our advices from Scotland are to the effect that the growth of wheat is turning out well, but certainly not in excess of former seasons; whilst from Ireland we learn that the produce is quite equal to 1858. Having thus shown that the new wheats are turning out large as to quantity, the question remaining to be solved is—what amount of produce will it be necessary to import from abroad during the remainder of the year to meet consumption? This is, perhaps, the most important feature in the trade as regards the shipping interest. Before we can arrive at a correct estimate, we must first consider the supply of old wheat in stock in this country. Although not a few of our farmers contended last year that the yield was a very moderate one, it is ascertained that the quantity now on hand is, perhaps, the largest ever known in the last week in August. Indeed we may safely calculate it at fully three million quarters. This excess in the supply, coupled with a fair harvest this year, seems to indicate comparatively low prices for several months. Here, however, another most important question presents itself, viz., what amount of foreign wheat and flour has been imported since the 1st of January? and further, what is the state of our warehouses, both in London and at the outports? From official returns just issued, we find that, during the first seven months of the present year, the arrivals of foreign and colonial wheat have amounted to 2,580,681 qrs. of flour to 2,623,091 cwt., against 2,746,442 qrs. and 2,792,455 cwt. respectively in the corresponding period of last year. It follows, therefore, that we are still importing extensively, notwithstanding that a considerable fall has taken place in prices

during the last three months. In order, however, to illustrate the matter more clearly as regards supply from abroad, we insert the following statistics of importations from 1853:—

IMPORTS IN THE FIRST SEVEN MONTHS.

	Wheat.	Flour.
	Qrs.	Cwts.
1853	5,539,009	2,956,629
1854	5,201,842	3,247,208
1855	3,869,155	1,144,898
1856	4,064,903	2,378,181
1857	1,574,047	1,172,748
1858	2,746,442	2,792,455

From the above it will be seen that the carrying trade has not suffered from want of grain freights; but, owing to the rapid falling off in the outflow of breadstuffs from the United States, and some other quarters, the foreign shipowners have brought more food to this country than in any former period. This, we think, will be evident on reference to the annexed figures, showing the countries from whence we have drawn wheat and flour—our two staple articles—in the seven months ending July 31, current year, compared with 1858 and 1857:

From	WHEAT.		
	1857. Qrs.	1858. Qrs.	1859. Qrs.
Russia	178,953	242,102	313,651
Prussia	415,783	456,901	375,764
Denmark	162,201	193,592	139,656
Mecklenburg	93,569	81,375	93,781
Hanse Towns	124,613	143,728	43,529
France	4,943	488,958	1,029,788
Turkey, Wallachia, and Moldavia	18,733	120,780	45,341
Egypt	142,406	311,275	342,681
United States	325,637	392,281	3,228
Other countries	107,209	285,450	192,362
Total	1,574,047	2,746,442	2,580,681

WHEAT MEAL AND FLOUR.

From	1857.		
	Cwts.	1858. Cwts.	1859. Cwts.
Hanse Towns	75,397	94,705	135,290
France	124,397	1,73,081	2,409,087
Spain	9,181	364	5,475
United States	923,439	1,338,792	24,863
Other countries	40,334	185,563	48,376
Total	1,172,748	2,792,455	2,623,091

This statement shows that France has this year forwarded over one million quarters of wheat, and not less than 2,409,087 cwt. of flour, while the total imports of wheat from the United States have been only 3,228 quarters, of flour 24,863 cwt., against 1,338,792 cwt. in 1858, and 923,439 in 1857. The bulk of the supplies of French produce have come to hand in foreign bottoms, so that the English Shipping interest has suffered materially from a deficient harvest in the States in 1858. What, then, is the amount of all kinds of breadstuffs imported into this country and consumed in a given number of years? To solve this question, we insert the total arrivals into the United Kingdom during the past six years:

GRAIN, FLOUR, AND MEAL OF ALL KINDS IMPORTED.

	Qrs.
1853	10,178,135
1854	7,909,544
1855	6,278,313
1856	9,339,425
1857	1,169,180
1858	13,168,261

Taking the average at ten million quarters, we perceive that we have already imported at that rate, and it is possible that we shall continue to do so until the end of the year; so that, in point of fact, there is nothing like scarcity to be apprehended, and there is nothing in the present state of the trade to induce large speculative operations. Nevertheless, the current of events will require to be carefully watched. Our own crop of wheat, as we have already observed, is a good one as to quantity; but we find that in France the yield is con-

siderably under last season. In the United States, too, the produce, though good, does not lead us to suppose that heavy shipments will be made to England, unless, indeed, our prices should advance considerably beyond their present level. Throughout Germany the crops are represented as a fair average, and in Russia they are turning out well. In the Italian States, as well as in Spain, Portugal, Turkey, and Algeria, including Wallachia and Moldavia, the yield is falling short of previous expectations. Still, bearing in mind that wheat is grown for export purposes, the general impression is that our importations will be equal to our necessities. We have stated that fully three million quarters of English wheat, the produce of 1858, are still in stock; but against this large quantity we must place very moderate supplies of foreign grain in our warehouses. For some time past, millers have imported freely on their own account, so that a heavy accumulation of stock has been prevented. The large increase in the duties on grain and flour in France, both as respects imports and exports, in other words, the return to the principles of "protection to agriculture"—has lately not only deprived us of a large quantity of food that would have reached us under the fixed-duty system, but it has almost ruined the milling trade in the northern

departments, whence we have been accustomed to draw largely, and has completely cleared the warehouses of foreign flour; consequently, consumption now almost wholly depends upon English produce.

We come lastly to the question of supply, as respects spring corn—viz., barley, oats, beans, and peas. Throughout Europe—including, of course, the United Kingdom—there are no serious complaints in reference to the yield. We may, therefore, look forward to average arrivals from all quarters, but no increase of stock, since it is well known that consumption here is chiefly met by foreign producers.

The present average price of wheat is 44s. 1d. Since the 1st of January it has averaged 47s. 1d. per qr., and last year, at this time, it was 42s. 6d. In the nine years ending in 1857, the average was 54s. 5d. per qr.; hence we have now a low value for the article. Barley is officially returned at 31s. 1d., against 34s. 6d. in 1858; oats, at 25s. 5d., against 27s. 10d.; rye, at 30s. 8d., against 34s.; beans at 44s. 6d. against 47s. 8d.; and peas at 37s. 8d. against 43s. 8d. per qr. These are moderately low figures, and, at present, we see no reason to anticipate any important changes in them for some time to come.—*Mitchell's Shipping Gazette.*

CALENDAR OF AGRICULTURE.

This is the busy month with sowing wheat. Seed-furrow the land as quickly as possible; sow as soon as ploughed; have the seed already dressed and measured; steep it in stale urine or salt-water, and dry it with hot lime for the drill machine or sowing by hand; cover by harrowing, and open the water-furrows of every day's work.

Dig potatoes by fork, and secure the crop in long piles thatched with straw and turf-earth. Secure beet, carrots, and parsnips, in a similar way. Remove Swedish turnips from lands to be sown with wheat; plough the land with one furrow, and sow immediately. Give the tops of Swedish turnips and of beetroot to cattle and sheep, moderately at one time, to prevent choking. Put gates and fences in repair, and shut-up the sown fields for the winter.

Prepare, by fallowing, the lands, or some portion of them, to be planted with early green crops the next spring. Plant potatoes with farmyard dung on the prepared ground: drill widely and deeply to protect the sets from frost.

Put the rams to ewes—one to fifty, and place each lot in a separate field. Give turnip-tops and beet to the ewes, which will much promote the salacity. All aged, unsightly, mitheriven, and ill-shaped animals, and the ewes that missed lambing last year, are neglected for the purpose of breeding, and the place supplied with the same numbers drawn from the ewe-lambs that are now eighteen months old. Much care and discrimination must be exercised in assorting qualities for the purpose of propagation. Mark the rams on the brisket with red paint, or black pigment, which will mark the ewes on the rump, and enable the shepherd to

put marks on the ewes regularly, as they are impregnated. This mark being affixed every fortnight, will be found very useful in housing the ewes for lambing in the spring, and in preventing any lambs being dropped unknown and unseen. Ewes must be got into good condition for the tupping season.

Sheep are smeared with some liquid ointment during this month to kill vermin, and to prevent rubbing and tearing of the fleece by reason of an itchy skin. Tobacco liquor is much used, with a small quantity of spirit of tar. The most approved mode now dips the animal in Biggs' Composition, dissolved in water, immersing the sheep for a few minutes, and then drying them on bare, clean ground. It kills all vermin, and very much promotes the growth of the wool.

The lambs will require the assistance of artificial food at the end of this month, as the grass of pastures will begin to fail. On dry lands confine the animals on spaces of the crop of turnips, divided by hurdles or by stake-nets, and give fresh spaces as the others are finished. On wet, poachy lands it may be better to cart the turnips daily to dry grass or stubble field, and cut off the roots on the field where they grow. Those intended to be fattened will require turnips in a similar way.

The bullocks that are foremost in condition must be tied in stalls singly, or placed in yards two or four together, and amply supplied with turnips, with the tops and roots cut away. Give the roots and tops to young cattle and to the flocks of store sheep. The young cattle are placed in yards, six or eight together, and regularly supplied with food, and well littered.

Feed milch cows with cabbages and the tops of turnips, and beetroot: give hay and straw in chaff, or steam the chaff and roots in mixture. Juicy food is indispensable for the secretion of milk.

Begin to fatten hogs for bacon. Use steamed food of meals and roots mixed, and finish with hard grains.

Sow winter vetches for the early spring crop, and in the succession of that most valuable plant.

Get the manure-pit in readiness; fill it with earthy and vegetable matters, in order to absorb the urinary liquids; and make clean all the culverts that lead from the cattle-yards to the tank. The absorption of liquids by earthy matters is the best use of urinary fæces, after all that has been written and spoken on the subject. Tanks should be roofed over, as darkness promotes putrefaction.

CALENDAR OF GARDENING.

Plant peas and beans, with the chance of an early crop. Transplant and sow hardy lettuce according to the directions before given.

Cauliflowers in frames are to have full air in dry weather, and at the end of the month remove the best plants to beds or warm borders, to be covered by hand lights: place three or four in a spot, making the earth firm about the roots and stems. Cover, till growth be established, then give all the air possible in the weather.

Plant hearting cabbages and colewort. Hoe and earth broccôli, cabbages, borecole, and Brussels' sprouts. Thin-out winter spinach, and make the ground clean. Tie up endive for bleaching. Cast over the decayed stems of mint, balm, thyme, and other sweet and aromatic herbs; hoe the ground,

and, if needful, add a little nice fresh earth to the spaces. Plant slips of the pot-herbs, and divide mint.

Now, at the close, dress the asparagus beds, casting over the haulm, and removing it. If seed be wanted, select some of the best; but clear the beds of it, and then rake off and remove every weed, so that the crown of the plants be rather exposed than deeply covered: all enrichment must be made just before growth. Clear seakale and rhubarb beds in the same manner. Commence to excite asparagus in frames, and seakale also.

Trench, ridge, and prepare land.

Pleasure Grounds: To remove litter, and to attend to neatness everywhere, are the early essentials.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR SEPTEMBER.

The weather having been somewhat favourable for out-door farm labours, nearly or quite the whole of the crops of grain have now been secured in the United Kingdom. Considering the scarcity of labour in many districts, the result of the harvest thus far is satisfactory. In our last month's report we intimated that as much wheat had been grown this year as in 1858, and, further, that the general quality and condition of the samples were various, and comparatively inferior. Such is our opinion still, and the accounts at hand from nearly every county in England continue to confirm this impression. Here, however, we may observe that the new wheats do not weigh well, the difference in them, compared with last season, being from 3 lbs. to 4 lbs. per bushel: hence they will yield so much less flour. Of course there are exceptions, since we have seen some very fine wheats, both red and white, disposed of, fully equal in quality to 1857, in which season, it will be recollected, some unusually fine wheats were grown, especially in Essex and Kent. But taking a deficiency as the basis of our calculation, we may consider the effect which it is likely to have upon prices. That there is abundant room for an upward movement in the quotations, considering that scarcely

any foreign flour is now competing with home-grown wheat, and that our granaries are by no means heavily supplied with the unmanufactured article from abroad, is evident; but against a falling off in the growth this year we have to place a large supply of old English wheat in stock. This supply will, of course, influence the millers' operations, and any increase in the importations of flour from the United States towards the end of the year, will no doubt throw a large quantity of home-grown wheat out of steady consumption. We imagine, therefore, that though fine qualities will keep up their value without difficulty, there is no prospect of any important movement in the quotations for some time.

The quantity of fine barley produced this season is very small, hence malting samples have sold briskly, at comparatively high rates. The growth of barley is large, and we may therefore look forward to low prices for all except good and fine samples. The barley harvest in Scotland has turned out very productive as to quantity, and fine in quality. In reference to the yield of oats, we may observe that it is a very moderate one; but that the growth of both beans and peas is considerably in excess of last season.

Throughout the Continent the grain trade has been devoid of animation; nevertheless, very little change has taken place

in the general quotations. In the United States, prices have continued to fluctuate; but at present they are too high to admit of profitable shipments to this country, notwithstanding that the result of the harvest generally is represented as very favourable.

The great abundance of the hay crop, both meadow and clover, has produced considerable inactivity in the demand, and a decline in the quotations. Straw, too, from its great abundance, has ruled lower in price. Although we hear of numerous individual losses by disease, the crop of potatoes is turning out much larger, and of better quality, than was at one time anticipated. Judging from the numerous samples which have come under our immediate notice, and the generally improved tone of the advices from most parts of England, we are led to conclude that the crop will prove quite equal to last season. In Ireland, the growth is represented as an average one; and in Scotland, as far superior to many former seasons. The prices paid in the metropolitan market have ranged from 50s. to 110s. per ton.

Most of our manufacturers are well stocked with colonial wool, yet English qualities have commanded more attention, and prices have advanced fully $\frac{1}{4}$ d. per lb. For export to Belgium a fair amount of business has been transacted, and the home growers seem indisposed to sell even at present rates. The clip has turned out a large one; yet, owing to the activity in trade, the whole will be easily worked up.

The growth of hops is again heavy, and it is understood that the duty will amount to fully £285,000. This large duty has checked the demand for all except the finest samples, which for the most part have changed hands at fair quotations, viz., from £4 10s. to £6 per cwt. There is still a large supply of yearlings and old hops on offer, and for which there is very little demand.

The heavy, or beet and turnip, crops are turning out well, although in some counties there is a larger failure of the plants than usual. The weight per acre is expected to be quite equal to last season.

In Ireland and Scotland there has been a fair, but by no means active, inquiry for fine wheat and barley, at very full prices. Other produce, however, has changed hands slowly, and the quotations have had a drooping tendency. The shipments from Scotland have rather increased.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Most of the leading markets held during the month have been well supplied with each kind of stock, as regards numbers; but the general quality of the supplies of both beasts and sheep has been very moderate, and it appears to be a pretty general impression that no important improvement will take place in it during the current month. It will have been seen that a wide margin exists between the value of the best and the most inferior breeds. That difference, however, has not increased amongst the foreign stock, in the general condition of which a decided improvement has taken place during the present year; indeed, very few sheep are now imported otherwise than in a fat state. The present stringent regulations at the Customs have induced great caution on the part of shippers abroad, and the result is, that foreign stock now reaches us in a much more even condition than for some years past. Most of the sheep from Holland show unmistakable signs of crossing with our best breeds, and, of late, numerous Hampshire and Gloucester Down rams have been purchased here by foreign breeders. Whether crossing with such sheep will be

advantageous remains to be seen; but our impression is, that the produce will turn out too fat for general consumption in this country. From our returns it will be seen that the importations have continued on an extensive scale, both as regards beasts and sheep. To some extent they have had a decided influence upon prices, which, however, have ruled tolerably high; and had the importations exhibited any serious falling off, the quotations in London, from the moderate nature of our home supplies, must have advanced considerably, even though the dead markets have come into active competition with the live trade.

The health of the stock generally has continued good, and there have been very few losses from disease in any of our grazing districts. From abroad, reports state that large supplies of both beasts and sheep are on hand for export purposes.

As regards the future course of the trade, it is tolerably clear to us that the value of really prime animals will rule high, since we must bear in mind that their numbers are comparatively small, and that consumption will be large for a considerable period. On the other hand, however, we must not presume that the quotations will be much, if anything, in advance of those now current, because, from the great abundance of keep, not only in England, but likewise in Ireland and Scotland, we may anticipate a greater production of good and useful stock. An increase in the weights of the breeds will, of course, tend to check any important upward movement in the currencies; besides, it may be reasonably inferred, that it will be more advantageous to keep the stock longer upon the land than to sell it off in a half-fat state. It will, therefore, be necessary on the part of the graziers to guard against too high a value for store animals.

Ireland still continues to furnish the London market with large supplies of really prime beasts and sheep. The supply of the former, received since we last wrote, has amounted to 2,500; of the latter, to 4,000 head. For the time of year, these are large arrivals—a proof that the prices realised here are remunerative to the Irish graziers.

There is an important matter now in operation, which cannot fail to have some influence upon the value of live stock in this country; we allude to the enormous amount of speculation going on in tallow, both here and at St. Petersburg. This speculation has led to an advance in the value of rough fat to 8s. $\frac{1}{4}$ d. per 8 lbs., and to a rise in the price of tallow to 58s. 3d. per cwt. on the spot. Instead of shipping tallow on arrival at St. Petersburg, the Russian speculators have warehoused some 20,000 casks; in other words, they have held them back for next season; consequently, our importations will fall short of previous expectations. The feeling in London is, that tallow will advance to 70s. per cwt. In that case, fat will be much dearer than it now is, and the value of live stock will hardly recede under this state of things.

The following figures exhibit the importations of foreign stock into London in the course of the month:—

Beasts.....	6,966 head.
Sheep	37,783 „
Lambs	1,358 „
Calves	1,744 „
Pigs.....	1,895 „

COMPARISON OF IMPORTS.

Sept.	Beasts.	Sheep.	Lambs.	Calves.	Pigs.
1854	7,805	26,250	748	1,894	2,281
1855	7,161	22,744	613	1,646	2,266
1856	7,084	20,605	3,000	2,772	1,559
1857	7,346	24,090	198	1,953	2,007
1858	5,999	25,488	717	2,735	2,472

The annexed return shows the total supplies of stock exhibited in the Metropolitan market:—

Beasts	24,560 head.
Cows	514 "
Sheep and lambs	145,430 "
Calves	1,891 "
Pigs	2,771 "

COMPARISON OF SUPPLIES.

	Beasts.	Cows.	Sheep.	Calves.	Pigs.
Sept. 1854.....	24,796	542	174,171	2,760	3,466
1855.....	24,667	540	152,120	2,477	3,921
1856.....	24,002	485	132,014	2,452	2,800
1857.....	25,734	532	127,715	2,220	2,585
1858.....	27,446	533	131,150	3,210	4,281

The arrivals of beasts from Lincolnshire, Leicestershire, and Northamptonshire, last month, amounted to 10,400 short-horns and crosses; from other parts of England, 3,400 of various breeds; from Scotland, 487 Scots and crosses; and from Ireland, 2,500 oxen and heifers.

Beef has sold at from 2s. 8d. to 4s. 10d., mutton 2s. 10d. to 5s. 2d., veal 3s. 4d. to 4s. 8d., pork 3s. 6d. to 4s. 6d. per 8lbs. to sink the offal.

COMPARISON OF PRICES.

	Sept., 1858.			Sept., 1857.		
	s.	d.	s. d.	s.	d.	s. d.
Beef, from	2	10	to 5 0	3	2	to 5 0
Mutton	3	0	5 0	3	4	5 6
Veal	3	8	5 0	3	4	5 2
Pork	3	0	4 6	4	0	5 2

	Sept., 1856.			Sept., 1855.		
	s.	d.	s. d.	s.	d.	s. d.
Beef, from	3	0	to 4 10	3	4	to 5 0
Mutton	3	8	5 2	3	4	5 0
Veal	3	8	4 10	3	10	5 2
Pork	3	6	4 8	3	6	4 6

Rather large supplies of both English and Scotch-killed meat have been on offer in Newgate and Leadenhall markets. Very prime beef and mutton have sold steadily, at full quotations; otherwise the trade has ruled heavy. Beef has sold at from 2s. 8d. to 4s. 4d.; mutton, 3s. to 4s. 6d.; veal, 3s. 4d. to 4s. 6d.; pork, 3s. 6d. to 4s. 10d. per 8lbs. by the carcass.

MID-KENT.

We are now in the midst of our hop picking, and all other works are suspended, or nearly so, by all growers, to give place to this all-important work. Hitherto the picking has progressed favourably, and the quantity obtained quite equal to what was expected—in fact, more in many instances, occasioning a rise in the estimation of the duty. The market accounts are various, nothing like a steady settled trade being yet arrived at, and the growers are perhaps pressing them too fast in. The samples generally may be esteemed good, but we hear of some mould about. The picking being all performed piece work, is paid for in most places in this neighbourhood at the rate of from eight to ten bushels to the shilling; and from 65 to 75 or 80 of such bushels make a cwt. of dried hops. It is also proper to observe that many of our hop-kilns have undergone great alteration in the drying, or rather heating, apparatus since last year: the introduction of a patent by Mr. Collins having promised great improvements, many kilns have been altered to that system: there is a difference of opinion of the result, and some growers have reverted to the oldest of all modes—the cockle—again, but time will test their respective merits. The hop gardens in general look pretty, and would well repay a visit by any one who has not seen such things, as a healthy hop plant in full bearing is certainly the most graceful plant I know of; and the gardens being now alive with people, the artist or painter might obtain many good ideas from the heterogeneous collection of workers. The beginning of the picking was in fine dry weather, but latterly it has been showery; but on the whole rain was much wished for; our grass fields were almost burnt up, and turnips made no progress, while there was a universal scarcity of water everywhere, streams being very low, and many wells (heretofore never known to fail) are now dry; every available drop of water is therefore duly prized, and there

are few who regret the discomforts the rain has created in the hop gardens. Nevertheless, with all the dry weather, the sheep have done tolerably well this summer, but cattle have made little progress, and I never knew our milch cows look worse at this season than they do now. The potato crop has turned out very badly; not that many are diseased, but they are so exceedingly small. The disease attacked the haulm in June, when they were only half grown, but dry weather setting in, it did not affect the tuber further than arresting its growth, and many crops have not grown since.

AGRICULTURAL INTELLIGENCE,
FAIRS, &c.

ABERYSTWTH FAIR was well attended, both by buyers and others. There was a large collection of stock exhibited of various descriptions; the show of horses large, but rather of an inferior character; cows and calves were numerous, and realised good prices; several mountain ponies were disposed of at fair prices.

ABINGDON FAIR was well attended. All descriptions of cattle, whether of horses or cows, were held for more money, in consequence of the great abundance of keep; this, to a certain extent, checked trade, but many first-rate horses, colts, and cows changed hands at full prices, particularly down calving heifers and cows of first-rate quality. There were not quite so many sheep penned as usual at this fair, but the paucity in numbers was made up in quality, and best pens of ewes, sheep, and lambs quickly changed hands at remunerating prices. Some first-class half-bred lambs were on offer at 35s. to 38s. per head, while "young toothed" breeding ewes realised over 48s. per head; in fact, according to quality, they were quite as high in figure as at the late Wilton sheep fair, when best lots of ewes fetched 50s., while inferior descriptions of "poor stale-toothed" ewes or weakly backward lambs, were hard to dispose of at any price.

BARNET CATTLE AND HORSE FAIR.—This great and important mart was held on Monday, Tuesday, and Wednesday, the 5th, 6th, and 7th of September, and it proved the largest and most successful that has been known for many years. If we required proof of the flourishing condition of the British farmers, we would look to such facts as the immense show of animals of all classes and conditions that arrived at this gathering, and the comparatively small number that remained unsold at the close of the fair on Wednesday. *Es ni, niki fit* is an old and very true adage; but the high prices at which the cattle changed hands at Barnet fair, and the large number that was disposed of, proves that there at least the proverb must be held in abeyance. Great must be the confidence of the graziers in the future demand for and price of butchers' meat, to justify the rates at which they made their purchases of lean or half-fat cattle. We devoutly believe, however, that their confidence is well founded, and that whatever may be the price of cereal produce, the increasing demand for animal food will ensure them a fair remuneration for their outlay. But to business. For some days previous to the 5th, droves of cattle of all descriptions kept incessantly pouring into the pastures and fields round Barnet. And there being plenty of aftermath, they had a good opportunity of refreshing themselves and recovering from the effects of the drift. A large proportion were of the Hereford and Devon races; but Wales, Scotland, Ireland, and the English counties were well and numerously represented, with the exception of the shorthorns, of which the show was small. The condition of by far the greatest part was excellent, and the drovers came upon the ground in high spirits, and large views as to prices, doubtless under a knowledge that the town was well filled with jolly farmers and graziers, who decidedly did not come there with empty pockets as mere spectators, but with a keen eye to the main chance, and a heavy purse to secure it. The fair commenced at eight o'clock on MONDAY morning, and after a little skirmishing between buyer and seller, the ball opened with the sale of a prime lot of twenty-four galloway Scots, three-year-old and in high condition, which brought from £19 to £20 per head. This was shortly followed by the sale of 30

Devon steers, which fetched from £12 to £16 each. A short pause succeeded, during which the intending buyers were evidently making their observations, and selecting their bargains; for about 11 o'clock, a simultaneous spirit seemed to pervade the whole body, as if each was afraid his neighbour should pounce upon the lot he had cast a longing eye upon. From that hour to the close of the first day, drove after drove left the fairstead in succession. It was said that of 9,000 Herefords and Devons that had been exhibited, not more than from 100 to 200 were left at the close of the day; but this may possibly be an exaggeration. The following will afford a correct idea of the range of prices of the different classes of stock. Herefords: Well-bred beasts, in high condition, £16 to £18; fresh, useful steers, £11 to £14; stock heifers, £10 to £11. Devons: High-conditioned bullocks, £17 to £20; useful do., for winter fattening, £12 to £15; inferior do., for spring grazing, £9 to £11. Durham shorthorns: The show of these was smaller than we expected; the best-quality beasts brought from £15 to £18; second-class, £12 to £15. Lincolnshire and half-breds, £16 to £20. Sussex: steers, for early fattening, £14 to £16; oxen, for the yoke, £40 per pair. Scotch: Galloway bullocks, in high condition, £18 to £22; good steers, for the spring markets, £14 to £17; Highlanders, £5 to £10 and £12. Irish: These were very numerous, and exhibited a marked improvement both in breed and condition, selling readily at the following prices: Good steers, £11 to £13; do., for early fattening, £15; yearlings, £4 to £8; heifers, £5 to £10. Welsh: Of these also there were several large droves, and an active demand for them sprung up; high-conditioned steers brought £9 to £12; two-year-olds, £8; heifers, £7; cows in-milk, £8 to £11. Milch cows: These were in great request, both for the London trade and the country; choice shorthorn beasts, in full milk, with calf by their side, brought readily £17 to £20; and first-class Yorkshire, £20 to £28; cows in-calf, £14 to £18; country-bred cows, £11 to £15; Alderneys, in full milk, £18 to £20; shorthorn heifers in-calf, £8 to £12; stock do., £7 to £10. Bulls: Yorkshire and shorthorns, three-year-olds £15 to £18, inferior £11 to £14. The sale of these, however, was not very brisk. The result of the first day's sale must have been highly satisfactory to the drovers; for so large a clearance was made, that the fairstead looked rather seedy at the close. On the other hand, the excellent quality and condition of most of the stock exhibited were duly appreciated by the graziers, and they completed their purchases with unusual celerity of decision. Our Welsh cousins displayed their accustomed vivacity, and at the completion of every sale, made the fairstead resound with their joyous shouts. The amount of money that changed hands the first day must have been enormously large. On TUESDAY the sale of the remaining cattle commenced again at an early hour, and a considerable clearance was effected at somewhat lower prices than those of the previous day. The largest portion of the stock left were Welsh and Scotch, with some Hereford and Devon steers. But the day was ostensibly devoted to the horse fair, which was well supplied with excellent stock, from the well-bred palfrey, destined to be graced by the elegant form of some fair equestrian, to the sturdy Belgian which yields a docile obedience to the hoarse command of the brewer's drayman. We give the following list of prices respectively obtained: Light hacks and roadsters from 16 to 24 guineas, well-bred saddle and harness horses 30 to 50 guineas, three to five-year-old ditto for double harness 80 to 100 guineas per pair, good useful farm horses 25 to 35 guineas; large strong ditto, for London use, 35 to 45 guineas; French cart horses 20 to 30 guineas. Welsh ponies, three-year-olds 12 to 16 guineas, two-year-olds 8 to 12 guineas, one-year-olds 5 to 7 guineas. Old garrans and London screws were at a discount of 100 per cent., consequently fetched from 0 to 000. We ought to state that the show of Irish well-bred colts was unusually large; and these spirited animals (which are much stronger and more enduring than their size would warrant a belief of) sold readily at remunerating prices. The show of Welsh ponies was also large, and the constant cheering of the sellers indicated a good business in their ware. WEDNESDAY.—"The end of a feast is better than the beginning of a fast." The fairstead presented a very meagre appearance this morning compared with that of Monday; yet many of the buyers who stood aloof the previous days (doubtless under the expectation of obtaining bargains at the close) found their account in thus postponing their purchases, the

drovers being willing to make a further reduction in price, rather than drive their cattle off unsold. Besides which, most of the prime beasts had been already disposed of at very remunerative rates, what were left being chiefly such as were fit only for the straw-yard or next summer's grazing. A few high-conditioned beasts still stood over, and were eventually bought towards the close by the London butchers. At an early hour the whole fairstead was cleared of the unsold cattle, which were driven off for Harlow Bush fair, which commenced on Friday, and an account of which will be found in another column.

BELINGHAM FAIR.—The stock was in good condition; the lambs were above an average in number; half-breds sold well, similar to last year, but Cheviots were a dull sale, with a part left unsold. The young cattle shown were about an average in numbers; trade dull. Milch cows in great demand from 15s. to 21s. 10s. There were about 70 foals shown, for which there was a good demand at prices from 8s. to 12s.

DAVENTRY FAIR.—Trade generally was extremely flat, and the prices of fat stock showed a considerable falling off, good sheep selling for 4s., and fat cow for £1 10s., below the rates obtained at the last fair. Store animals maintained their prices, but only a few changed hands.

CASTOR FAIR.—The number of sheep, as well as of buyers and sellers, exceeded that of any former year; but owing to the high prices asked for sheep, several lots went out unsold.

CARLISLE FAIR.—The show of white stock was about a third under the number shown at the corresponding market last year. The stock, which was in good condition, was composed of half-bred and Cheviot lambs, with several lots of crosses, and a few lots of Cheviot draft ewes. The total number of all kinds was 10,400, or about 5,000 less than last year. There was an excellent demand for lambs, customers having been seldom so plentiful. The best half-breds were more in request than secondary kinds, and the crosses were early picked up. Prices were 6d. to 1s. a-head up from recent markets. The demand for draft ewes was rather dull, and prices were fully as low as those lately current. At half-past three o'clock there were a few lots of lambs, mostly small half-breds and mid-Cheviots, unsold, and a lot or two of Cheviot ewes. Prices for half-bred lambs may be quoted from 14s. to 22s.; Cheviot lambs, top widders, 11s. to 13s. 6d.; mid-lambs, 7s. 6d. to 10s.; crosses, 12s. to 16s.; Cheviot ewes, 18s. to 22s. The show of cattle was large, and was composed of Shorthorns, Galloways, Highlanders, and Irish, a large portion being of the latter kind. There was a fair demand for cattle of good quality; but very high prices being asked, the market was rather stiff, especially for Galloways and Highlanders. Though the market was better than anticipated, there was little advance in prices obtained. The prices of the best three-year-old Galloway bullocks ranged from £10 to £12. One-year-old Galloways were selling from £4 10s. to £7; few of this class were unsold. Two-year-old Highlanders, £6 to £7 10s. For a lot of three-year-old Highland Heifers £8 was refused. The best three-year-old shorthorn bullocks were bringing from £12 to £17, ordinary £9 to £10 10s. Irish cattle, three-year-olds, £8 to £10 10s. A large number of Irish beasts would be left unsold. The show of horses was the greatest that has been known for many years, and included a large number of young horses and colts, though a very great proportion of the animals were of an ordinary and inferior description. Good young draught horses were bringing from £35 to £42.

CAERWYS FAIR.—There was an abundant supply of best stock from the surrounding neighbourhood. The supply of sheep was unusually large, for this county. Everything sold early, and realised tip-top prices. Buyers were plentiful.

DUNDEE LATTER FAIR.—There was a good show of fat cattle, for which there was a fair demand. Mr. Thomas Lowe bought the following lots for Mrs. Gibbs, Dundee: 10 cattle from Mr. Bell, Ardowrie, for 19l. each; 8 fat cattle from Mr. G. Millar, Balcaik, at 19l.; 5 do. from Mr. W. Brown, at 17l.; 11 cattle from Mr. James Nicoll, Forfar, at 16l. Mr. Low, from St. Andrews, bought two lots, one of 15 cattle, from Mr. George Millar, Balcaik, for 18l. 17s. 6d., and another of 10, from Mr. David Macdonald, for 17l. Sales were dull for lean cattle. There was also a good show of horses, but sales were dull.

DUNSM FAIR.—The show of draught ewes this year was larger than usual, but notwithstanding this the demand was brisk in the early part of the morning, although as the day wore on sales became sluggish. Half-bred ewes from 38s. to 40s. The show of Cheviot ewes was so small that we could not return their prices: while lambs, of which there was a great quantity in the market, and for which the demand was rather dull, good half and three-parts bred fetching from 16s. to 22s. There was a large number of cattle, but few sales were effected.

FALKIRK TRYST.—On Wednesday the show was not what was anticipated, and was principally composed of a few Aberdeens, Morays, and Angus cattle. Few Fifehires appeared on the ground. The superior kinds suffered a reduction of 2½ per cent., and the inferior kinds 5 per cent., from Tuesday. The above descriptions were looked after, but the holders would not give way to meet the wishes of the offerers, and the result was that the lots disposed of were about 7½ per cent. below the prices of Tuesday. There were also a few West Highland stots, and some inferior classes of heifers. The show of Highland beasts was not so numerous as was expected. A lot of old West Highland bullocks, which stood Tuesday's market, were brought into the tryst-ground to-day, and offered at 1s. less per head than the sum asked yesterday; but they were not sold. Of horses there was a large turn-out for a second day of the tryst, but sales were stiff. At the close of the market a considerable number of the inferior or third-class of stots were left unsold. It was altogether allowed to be a bad market to the holders.

GLASTONBURY FAIR.—There was a great number of sheep, and many prime sucking colts, many of which soon changed hands at as high as 20 gs.

GLOUCESTER MONTHLY MARKET.—There was a fair supply of both beef and mutton, with a sluggish trade, as former quotations were not complied with. All kinds of meat declined in price about 4d. per stone, and even at this reduction an entire clearance was not effected. Beef, from 6½d. to 7d.; mutton, from 6½d. to 7½d. per lb.

HAWICK TUP FAIR.—The following are the highest, lowest, and average prices of most of the lots of rams sold by A. Oliver and Son, in their ring on Tuesday: Leicester Tups.—Mr. Turnbull's Spital (40), highest, 6½. 7s. 6d.; average, 4l. 2s. 6d.; lowest, 2l. Mr. Dickieson's Magdalene Hall, (30), highest, 4l. 10s.; average, 3l. 10s. 6d.; lowest, 2l. 17s. 6d.—Cheviot Tups: Mr. Elliot's, Hyndhope (73), highest, 42l.; average, 5l. 4s. 4d.; lowest, 1l. 10s. Messrs. Elliot's Myrddykes and Sindon (18), highest, 6l. 15s.; average, 3l. 13s. 4d.; lowest, 1l. 12s. 6d. Mr. Mitchell's, Kirkhope (20), highest, 2l. 12s. 6d.; average, 1l. 18s. 3d.; lowest, 26s.

HOWDEN GREAT HORSE FAIR.—We do not remember having seen a busier fair for many years. Prices were generally high. We have seen more first-rate horses shown, though we hear of one being sold for 185 guineas, and another for which £300 was asked by the owner. The gentlemen visiting the town include the principal London and provincial dealers, and several from the Continent.

ILSLEY FAIR.—There was a good supply of sheep. Although the trade was not so brisk as on the 26th ult., a pretty good clearance was effected at the prices then obtained.

KINGTON FAIR, for the supply of stock and sheep, was far beyond that of any former year. It was indeed remarked to be the largest fair ever remembered here; in fact, the general impression was that the fair was overstocked. The stock generally was of first-rate order, and the attendance of buyers was also good; but, owing to the abundant supply, for a time the demand was somewhat dull. As the morning wore on, however, the demand for both stock and sheep increased and became brisk, with a rise in price; and ere the fair closed a larger number of cattle and sheep than was at first anticipated had changed ownership, and consequently a heavy amount of cash changed hands. Taken in the whole, the fair was a satisfactory one.

LAMBERT'S CASTLE FAIR.—There was a tolerable supply of sheep, which sold—ewes 32s. to 38s., wethers 34s. to 40s., lambs 21s. to 30s., barreners £8 to £10, cows and calves £12 to £15.

LEWES SHEEP FAIR.—The day was one continued series of heavy showers. In despite, however, of the weather, considerable business was done at advanced prices from those of last year. The supply of lambs, as we expected it would

be, was short, but the prices ranged for lambs from 22s. to 30s., and for ewes from 28s. to 47s., being about 1s. 6d. per head in advance of last year. The fair altogether was rather tardy, especially at the close, and several lots were left unsold. The following prices were obtained for lambs:—Mr. R. Woodman, 26s., 20s. Mr. Langridge, 23s. 6d. Mr. Waters, Westdean, 24s. 6d. Mr. Saxby, Rottingdean, 22s. Mr. Hudson, Portlady, 22s. Mr. C. Davey, 25s., 22s. 6d. Mr. Park, 20s. Mr. Farncombe, calls, 23s. Mr. Aahby, 30s., 28s. Mr. Pennington, Alfriston, wether, 20s. Mr. Catt, Firie, 24s. 6d. Mr. Pagden, Frogrie, 26s. Mr. Board, Rottingdean, 22s. Mr. Verrall, Swanborough, 23s. Hon. H. Brand, M.P., 21s. Mr. Farncombe, St. Leonards, 25s. Mr. Brown, Patcham, Mr. Morris, Ranscombe, 27s., 19s. Mr. R. Brown, Newhaven, 25s. Mr. Hale, 20s. Mr. Gooden, Eastbourne, 18s. Mr. Springate, Street, 18s. Mr. Thompsett, Hodden, 25s. Mr. Emery, 30s. Mr. G. Newland, Sompington, (ram lambs) 68s. EWES.—Mr. G. Penfold, Wiggonholt, 47s. Mr. Donaldson, manager to the executors of the late Mr. Hugh Penfold, Armington, 46s. 6d., 42s. Mr. Saxby, Rottingdean, 35s. Mr. Thatcher, 38s. Mr. Harrison, 27s. Mr. Madgwick, Balmer, 32s. Mr. Catt, Firie, 32s. Mr. Pagden, Frogrie, 32s. Mr. Ellis, Exceat, 36s. Mr. Page, Heighton, 35s. Mr. Pennington, 30s. Mr. Gorrings, Kingston, 45s. Mr. Cane, Berwick Court, 40s. The ewes which obtained the top price of the fair, 47s., were from Mr. Penfold's, of Wiggonholt. They are really first-rate, and were very greatly admired. They were bred from the flock of Mr. Thomas Ellman. Mr. Boys had some good rams, as also Mr. Scott Hayward and Mr. Emery. Mr. Thoe. Ellman's ewes were the admiration of the fair; four persons bespoke the refusal of them at 60s. each, offering 55s., at which price they were sold to the first bidder. Mr. Thomas Ellman's rams were also highly approved and 15 guineas each were refused.

LINCOLN FAIR.—There was a much larger number of sheep than is usual at this fair, for which the trade was not quite so brisk as had been anticipated. In the beast fair, the show was not large, although it included some very useful cattle. The horse department was quite a busy one for Louth, and at the present rate of improvement it promises to be a very important branch of the September fair. Several young horses changed hands at smart prices. The best descriptions of beasts realised from 7s. 6d. to 7s. 9d per stone, but stores were less saleable at a decline upon late prices. The sheep market was the largest known for many years at this particular period, although the supply consisted principally of lambs and ewes. Lambs realised from 22s. 6d. to 30s., and middling sorts of ewes (called) from 28s. to 36s., the best descriptions making from 40s. to 42s. There was a very large show of pigs, and still larger bustle, but the real business transacted was only on a small scale. Good stores were in demand, and the smaller sorts were a drag at about late rates. In the horse fair several Irish droves were exhibited, but the principal feature in the fair was the show of foals, which was somewhat large. The trade in this portion of the fair was somewhat slack, although considerable business was done at reduced prices. The best cart foals realised from £12 to £16.

LUTTERWORTH FAIR.—There was fully an average number of store cattle, and the number of sheep and horses (the latter chiefly Irish and Welsh) may be said to have been large. The business transacted was, however, at steady prices, and comparatively limited in amount.

LYMINGTON FORTNIGHTLY MARKET was well attended, both by dealers and buyers. There was a good display of stock of all kinds, which met a ready sale, to the satisfaction of all parties. The pigs also mustered in great force, and changed hands at remunerating prices.

MOFFAT TUP FAIR.—There was a large show of rams, especially Cheviots, of which there were 887 of all ages. For the best class of Cheviot rams there was a good inquiry; for these sales were readily effected early in the day. For ordinary kinds the demand was rather dull, and the large number shown caused sales to be slow, and a good many were unsold. There was a good demand for bred sheep, but there were few of superior quality, nearly all shown for sale in the pens being of an ordinary description. There was not much inquiry for blackfaced tups, though a few were sold at good prices. Best Cheviot rams, two to three year old, ranged from £8 to £15; ordinary, £3 to £6; one year-olds, 30s. to £3; Cheviot tup lambs from 15s. to 35s.; Leicester tups, £2 to 28 6s.; black-

faced tups, £2 to £8. A good deal of business was done among Cheviot draught ewes at prices in some cases rather below those of last year; prices ranging from 18s. to 24s.

MONIALVE FAIR.—The show of stock was considerable, amounting in all to about 4,000 head, and consisted chiefly of lambs, generally seconds, and a few lots of old ewes, double milled. For everything good in the shape of half-breds and crosses the demand was fair. For Cheviots the inquiry was rather dull, but on the whole the fair was a selling one, and few lots at the close remained unsold. We subjoin a note of some of the sales: Mr. Donaldson sold a lot of half-breds at £1, the highest price we learned; Mr. Jamieson disposed of his half-breds at 18s. 8d.; Mr. Smith sold his at 13s. 9d.; Mr. Wallace, Auchanbrach, bought a lot of Cheviot ewes at 15s.; Mr. McMillan disposed of his at 18s. 9d.; Mr. Moffat sold his crosses at 12s.; Mr. Good sold his blackfaced ewe lambs at £1 5s., and Mr. Barbour, Bogue, a lot of small blackfaced lambs at 7s. 6d. each. Cheviot ewes may be quoted from 15s. to 18s. each; and we heard of blackfaced ewes being disposed of previous to the fair, at prices ranging from £12 to £16 10s per 21; half-breds from 12s. to £1; Cheviots 7s. to 8s. each.

MOSS OF BALLOCH HORSE MARKET.—There was an extra number of horsedealers present. The supply of horses of all descriptions was the largest that has been witnessed at Balloch for many years. The stock was generally of a very superior character, and consisted chiefly of prime-going animals from two to three years old, some excellent horses a little older, a fair show of roadsters, and a few ponies. The market, however, was an exceedingly dull one; and less business was transacted than on any similar occasion. There was, consequently, a considerable reduction in the prices as compared with former years, the falling off being variously estimated from 10 to 15 per cent. Good draught-horses brought from 30l. to 45l. For several very superior animals as high as 50l. was asked. The rates for second-class horses averaged from 25l. to 30l.; but it was chiefly in the better sorts that any business was done. Two-year-old colts and fillies brought from 25l. to 34l.

MUIR OF ORD MARKET. Sept. 21.—The sheep market evinced a brisk demand for good ewes. Widders not in quite so good demand. Lambs were readily purchased for fair prices. The general impression of the market was very satisfactory; and, with a few exceptions, all the lots shown were disposed of. Among the sales were the following: Mr. Macgregor, Auchnochie, sold Cheviot ewes at 18l. per clad score; Mr. Mackenzie, Moy, sold Cheviot ewes at 16l. 10s.; Mr. Ross, Castlecraig, a lot of Cheviot ewes at 19l. per clad score; Mr. Bankes, of Letterewe, sold Cheviot ewes at 17s. and 13s.; the Strathbran ewes 15s., and lambs 12s.; Lenabader tup lambs, 11s. 6d. Mr. Grant, Aldie, Tain, bought Cheviot ewes at 14s., and a lot at 17s.; Mr. MacLennan, Ord, sold blackfaced lambs at 7s.; Mr. Munro, Ord, Invergordon, bought blackfaced widders at 14s.; Mr. Fauns bought a lot of ewes at 15s. 6d., also a lot at 13s. 6d., and 200 blackfaced lambs at 5s. 6d. The show of stock was good, though somewhat less in number than the corresponding week of last year. Prices for good cattle were well maintained, and the demand was active. Among the sales were these: Mr. Young, Tain, bought a lot of two-year-old cross stots at 12l., and a lot of stirks at 8l. 15s. Mr. Alison, Redcastle, bought six-quarter-old cross stots at 9l. 10s.; Mr. Mackenzie, Ardross, sold to Mr. Cumming, Fingask, two-year-old cross stots at 13l. 10s.

NEWTON ABBOTT FAIR.—A very large number of horses, cattle, and sheep, which were in active demand; and a large trade was done, especially in horses. In fact, so large a fair has not been known for many years past.

NORTHAMPTON FAIR was numerously attended by farmers and graziers, and a good deal of business done. The show of store beasts, though pretty large, was not a good one, the great bulk of the cattle offered being by no means first-rate; nevertheless they sold well and made good prices. The sheep fair was very large, particularly as to barren ewes; good ones made good prices, but old ones were bought lower. Store lambs were in good supply, and good ones fetched high prices. An active demand prevailed generally for beef, at from 4s. to 4s. 6d. per stone. Wether mutton was scarce, and little shown, making 4s. 8d. per stone. The horse fair, as usual, consisted of all descriptions; right good and useful ones,

whether hackney or cart kind, difficult to meet with, and such make plenty of money.

PARTNEY FAIR.—Purchasers were not so numerous as had been expected; and business was rather slow, although good prices were obtained. Lambs 25s. to 32s., sheep 44s. to 57s. each. There was a large number of superior fat oxen, which sold at high rates.

READING FAIR.—The supply of cattle was good, but the demand inactive. In the horse show there were some exceedingly well bred and handsome colts, which commanded a ready sale. The prices of stock, &c., were as follows: Well-bred steers for stall-feeding 11l. to 14l., stock heifers 8l. to 10l., and yearlings 4l. to 6l.; milch cows (useful shorthorns in full profit), 16l. to 19l., home-bred ditto 12l. to 14l.; cows to calve down 9l. to 11l., and in-calf heifers 6l. to 9l.; dry cows, grass-fatted, 18l. to 20l., ditto fat heifers 11l. to 14l.; bulls 11l. to 18l.; thick-set, short-jointed, young cart horses, for London purposes, 35 to 45 guineas, seasoned ditto, for agricultural work, 24 to 32 guineas; two-year-old cart colts 16 to 24 guineas; good upstanding young horses, for double harness and machine work, 35 to 45 guineas; free-stepping, high-actioned, young cattle, for light harness, 28 to 40 guineas; well-bred colts, for riding, 48 to 55 guineas; yearlings, 12 to 16 guineas, and weaned foals 8l. to 10l.; brood mares, with colt a-foot, 22 to 32 guineas. Aged hacks and used-up cart horses were without sale.

TEWKESBURY FAIR was unusually well attended by farmers and dealers, and the supply of stock was large. The greater part of the sheep were sold by auction.

TOWYN FAIR was one of the largest ever previously seen here; a great quantity of cattle was offered for sale, but they were generally of inferior quality. The drovers were very numerous, but did not at all feel inclined to give the prices asked by the farmers, consequently but few changed hands. Bullocks from 9l. to 10l.; two-year-old steers valued 7l. to 8l., yearlings from 5l. to 6l. Milch cows and calves from 10l. to 12l. Fat bullocks 6½d. to 7d. per lb. The horse mart was sluggish. There was a great quantity of suckers; some very good ones were sold at low figures, from 7l. to 7l. 10s., and upwards; strong useful cobs were eagerly sought after, but prices ruled high, and very little business transacted. Pigs were scarce; stores fetched from 10s. to 15s., eight to twelve weeks old; there were no fat pigs in the fair. Upon the whole it was a dull fair.

WORCESTER FAIR.—About 6,000 sheep were penned, and the supply of cattle was also good. Beef made from 6½d. to 7d.; good mutton 7d. to 7½d.; prime lamb 8d. per lb. The mutton was all sold. Pork brought about 10s. per score. Of store ewes many went back unsold. The fat sheep were all bought up.

IRISH FAIRS.—**BANAGHER:** The second day was confined to the sale of horses, of which the supply, particularly of young horses, was much larger than for some years past, all of which were in good demand, but few purchases at high figures were made. Several dealers were in the neighbourhood, and purchased nearly all the high-bred horses before the fair. The chief sales during the day were amongst the "long tails." Prices averaged £128 to £35. But few hunters, which brought from £60 to £125, and good harness horses brought from £30 to £50. The business on the third day was confined to the sale of horned stock. The supply was less than last year, and for several years past there has not been so dull a market. None of the usual extensive buyers were present, and sellers were disinclined to part with their top lots, awaiting the approaching fair at Ballinaloe. Farmers holding small lots were obliged to sell, owing to the scarcity of hay. Beef was in fair demand, heifers ranging from £12 to £15; bullocks from £10 to £14 14s.; store cattle not in request, and a large number remained unsold. **BALLINAT:** The demand for stock was uncommonly good, and prices seemed on the rise. The sheep fair was characterised by a good demand also. **STROKESTOWN:** The demand was still in favour of bullocks of any age, but good stock of every kind met with a ready sale. Three-year-olds brought £10 10s. to £15, two-year-olds £8 to £11, year olds £5 to £8. There was a large supply of sheep, but not equal to the demand. Prices, 42s. to 50s.; lambs, 22s. to 30s. each. **BALLINBOURGH:** The sheep department was crowded, and a large amount of business was transacted. Good widders brought 50s. to 62s. 6d. each, hogget ditto from 45s. to 55s. each;

ewes sold well. Fat cattle scarce, and all of this kind sold freely at 56s. to 62s. per cwt., inferior from 46s. upwards. Stores sold slowly, and a large proportion left unsold. Pig trade brisk, and prices showed a tendency to advance. Store pigs in good request. DUNDEE: Good beef brought 50s. to 60s. per cwt.; store bullocks, two-year-old, £9 to £13. Good dairy cattle were in demand, but inferior descriptions were a drag. NAVAN: Good beef was scarce, and brought 56s. to 60s. per cwt., inferior 45s. to 50s. On store bullocks there was a decline in prices. Good two-year-olds brought from £10 to £11 per head, inferior from £8 to £9. Store lambs were in good request. The supply of horses was large; some went as high as £50 to £70. Farmers' horses were on

the fall in prices. Bacon brought a high figure. Store in request, at £2 to £3 each. CARLOW: There was a poor supply of stock. Some three-year-old heifers sold at £10 each. In sheep nothing prime offered. Bacon pigs 65s. per cwt. No store pigs. DUNDALK: The figures realised for cattle were lower than those obtained at late fairs, in some instances to the extent of 30s. per head. The sheep fair was very slow. Large heavy bacon pigs sold rapidly, and prime quality brought fully 52s. per cwt. TULLOUGHMORE: The stock exhibited was of an inferior description, and the prices ruled low. GALWAY: Prices also rated low. There was only a poor show of black cattle. Sheep ranged from 30s. to 40s.; lambs 14s. to 18s.; and Connemara sheep fetched from 13s. to 15s.

REVIEW OF THE CORN TRADE DURING THE PAST MONTH.

The month of September was showery, making the completion of the harvest a protracted business, but the work may now be considered as finished, with no serious damage to the late gatherings. Taking the whole cereal crops into consideration, we have perhaps reaped a fair average, and where deficiency obtains it is chiefly in the quality of the wheat and barley, much of both being very inferior, more especially the latter. The hay crop has been particularly good, with much well secured of a second cut in the Midland Counties, and all roots excepting potatoes have received benefit by the rains. The progress of disease among the latter is not so rapid as expected, but a great many were lost in the ground. Complaints increase in Ireland, where they are selling off cheap, in the fear of their not keeping: a large speculative demand has therefore sprung up for Indian corn as likely to be extensively used eventually as a substitute for this esculent. Notwithstanding the quantity of rain received, the subsoil of the land is unusually dry, and many wells as yet fail to give the usual supply of water; more rain may, therefore, be expected, and perhaps a wet winter. Preparations for autumnal sowing have commenced, which will require much diligence from the over-growth of weeds, but it is to be hoped the weather will favour the deposit of the seed. The close of August was connected with a rapid fall in the wheat trade, when prices were brought so low that there seemed no room for a decline, but the state of feeling in the trade was equally against any important advance. September has therefore been a steady month, closing with a more cheerful tone, and some improvement on the starting price, say fully 1s. per qr., and as with this small increase the London market is comparatively the cheapest in the world, farmers have a right to gather confidence, and with the exercise of some patience they may find a more adequate remuneration than is now afforded. Millers have kept up the hand to mouth system. Foreign imports have come in on a smaller scale, Italy is seriously deficient, and a new decree from Naples extends the time for the admission of foreign imports to 30th June, 1860. This news has already influenced Odessa, Marseilles, and several foreign ports; but as the Italian markets are not speculative, and are under govern-

mental surveillance, no great reliance can be placed on the permanency of their quotations. France, whence we have recently drawn our chief supplies, has undoubtedly had a deficient harvest, some making the deficiency 15 to 20 per cent. on the previous yield; Belgium and Holland are also short. Should France, therefore, as the season advances, turn the tables, a new range of prices may ensue; and though America is this year said to exceed last year's yield by a surplus of five millions of quarters, yet the consideration of price with this speculative people will determine their exports, and as yet New York is firm for white wheat, of 64lbs. per bushel weight, at 52s. per qr. Northern Germany this year has a very fine quality to boast of, but the quotations at Dantzic for fine wheat are nearly the same as in London, say 50s. to 51s. per qr. for the first quality high mixed. These considerations, with the better tone of our own country markets, all seem to say that the lowest rates have already been about reached, and the tendencies are towards amended quotations.

The rates noted below show recent prices abroad. Fine French flour in Paris has brought 35s. per sack, only worth in London about 37s. per sack, duty, freight, and expenses paid. The best wheat there was worth 44s., and at Bordeaux 46s. per qr. Red native wheat at Antwerp brought 47s., at Louvain 50s. In Amsterdam fine Polish brought 52s. Fine red at Hambro' was worth 46s. per qr. The quotations at Konigsberg were about 48s. New wheat was arriving at Odessa, fair quality Ghirka being worth about 38s. per qr., hard to 41s. At Galatz hard wheat had been placed for the Ionian Isles 30s. 6d. per qr., and contracts for soft new at 28s. 6d. for future delivery. Flour at Santander was worth 40s. per sack of 280lbs. At Barcelona 50s. per sack was paid, wheat both there and at Seville bringing 62s. per qr. for first quality. This is the more surprising as Spain this year is generally well spoken of, as to its yield of corn; but the difficulty of transit there greatly enhances the rates, and makes prices extremely irregular. At Naples foreign wheat was worth 48s. to 49s. 6d.: it was probable government would make sacrifices for the poor.

The first Monday opened on moderate supplies, both English and foreign; but the morning's con-

tributions from Kent and Essex were quite an average. The quality was very middling; and as the day was fine, it was very dull, and only picked samples were taken at the previous rates, much of the inferior remaining unsold. The foreign business was small, at former prices, Baltic qualities finding most inquiry. The country advices this week were very similar to those of London; but the preponderance of new samples of a low description made old more in request. For new sorts several places quoted a further decline of 1s. per qr., as Spalding, Lynn, Wolverhampton, Gainsborough, and Newmarket. Liverpool, on the Tuesday's market, was better attended, wheat going off pretty freely, at the previous Friday's decline of 3d. per cental; and on Friday there was no change.

The second Monday began on a small quantity of English wheat, and only a moderate foreign arrival. The near counties, as though dissatisfied with former markets, sent up but little in the course of the morning. But the business resulting was in a like proportion, millers taking their leisure, and picking their lots grudgingly, at former rates; while at the Kentish stands, where there was some pressure to sell, rather less money was taken. Dry foreign was taken in retail, for mixing, at previous rates. The country this week, though better supplied, was quite indisposed to take its tone from the London advices, some farmers returning with their samples unoffered, though former rates were procurable; while several places reported higher quotations. Birmingham, Manchester, Wolverhampton, Spalding, Newark, were all 1s. per qr. dearer; Norwich and Newcastle making the advance 1s. to 2s. per qr. Liverpool also, on Tuesday, was 2d. per cental higher, with a better sale, and on Friday the further improvement was 2d. per cental more; but some places, as Gloucester and Bristol, only noted more firmness.

The third Monday still had only moderate supplies, about equally divided between foreign and English. Kent and Essex factors presented the usual morning's show of samples; and as the country markets were ahead, higher rates were generally demanded—say about 2s. per qr.; but eventually, the business done was at only 1s. per qr. advance on picked samples. The business in foreign was, however, decidedly better; and samples of quality brought fully 1s. per qr. more. The country markets fully acted on the London advices. Gloucester, Bristol, Gainsborough, Spalding, and Melton Mowbray reported 1s. to 2s. per qr. advance; Hull, Manchester, Boston, Lynn, Newbury, and many other towns, raising prices 1s.; but Birmingham, Leeds, and Sheffield were only in improved tone. Liverpool, on Tuesday, maintained the previous advance of 2d. per cental; and Friday was without change.

The fourth Monday began on larger receipts, both English and foreign; but the morning's supply from Kent and Essex was small. The trade was slow, but prices steady both for good English and foreign samples, the quality of the latter being preferred to the average of new English.

The flour trade, notwithstanding the great fall-

ing off in French supplies, has not varied through the month, town prices and Norfolks closing respectively at 43s. and 30s. per sack, as they began. Some American has lately been dropping in, but, it is feared, not of good quality.

The receipts of wheat and flour in London, for the four weeks, have been as follows—viz., 25,728 qrs. English, 30,145 qrs. foreign wheat, against 31,165 qrs. English, 44,219 qrs. foreign, for the same time last year. Of flour, 58,063 sacks country, 960 sacks 1,981 brls. foreign, against 61,031 sacks country, 15,652 brls. 2,345 sacks foreign, in 1858.

The total foreign imports for the Kingdom, in August, were 304,564 qrs. wheat, 118,115 cwt. flour.

The oat trade, in consequence of unusually heavy arrivals from Russia, has been depressed, and the value farther reduced about 6d. to 1s. per qr.—the first reduction being 6d. per qr. on the second Monday, and on the third, with a supply reaching to about 105,000 qrs., it again gave way, these being the heaviest receipts for one week since October, 1858. As the relative value in the Russian ports is greater than here, and the approach of winter will prevent exports thence, an improvement seems very probable as supplies diminish. On the fourth Monday, indeed, with large supplies, again there was a reaction in favour of Russian samples to the extent of 6d. per qr. The receipts in London for four weeks were 8,272 qrs. English, 1,830 qrs. Scotch, 12,456 qrs. Irish, and 250,600 qrs. foreign, giving a total of 273,158 qrs., against 194,000 qrs. in September, 1858. The exports for the month were 489 qrs. The imports into the kingdom for the month of August last were 300,317 qrs.

The short arrivals of barley through the month, both as respects native and foreign supplies, have given more tone to the trade in all good qualities. As yet very little fine English malting has come to the London market, picked samples being eagerly sought in the country at great prices, from 40s. to 48s., and even more, being paid for such. These extreme rates will in some measure compensate growers for the damage sustained generally to the crop, first by the excessive heat of July, and subsequently by sprouting from the rains. The market has, however, been very dull for light inferior and discoloured English, such being no better, or rather hardly so good as that brought in quantities from Odessa and the Black Sea. The new Saale description yet received, though kindly, has been thin, and only worth about 35s. to 38s. per qr., and fine new French has been scarce at Paris, and held high; so there is no probability of any successful competition with the finest Scotch and English. These are likely, therefore, to command high terms all through the season, and it is equally probable that the inferior sorts will remain low priced in consequence of free importations from the East, as well as the greater relative cheapness of maize. Foreign sorts have been firm, without change of value, through the entire month. The imports for the four weeks into London were 5,215 qrs. British and 9,987 qrs. foreign barley, against 4,976 qrs. British and 43,955 qrs. foreign in September, 1858.

The imports for the kingdom for the month of August were 97,450 qrs.

The malt trade, like that of barley, has undergone no fluctuations of value in the past month, but the sale of all qualities below the finest has been more difficult.

Old beans have about maintained their value through the month; but new coming to market earlier than usual, and in some quantity, before the demand becomes extensive, have given way 1s. to 2s. per qr. from the first-made prices. The present prices of old may tempt French houses to make some shipments. Some quantity may be expected from Egypt, and while oats rule so extremely low, the demand must be diminished, so that we cannot expect much improvement in the prices of old for some time, while if sales are forced they may probably be lower. The imports into London for the four weeks were 4,499 qrs. English and 3,849 qrs. foreign, against 3,863 qrs. English and 6,949 qrs. foreign in September, 1858. The entire imports for August were 21,060 qrs.

Since the new crop of peas has been got in, the supply has greatly increased, and the foreign arrivals have been fair. Seed peas have commanded good prices, but boilers not being in demand have been neglected, and all hog descriptions, especially maples, have given way in price; these latter, however, still command good prices, and seem more likely to be cheaper than otherwise, as the crop has generally been good, though the seed is small. The great falling off in the demand for white boilers last season, should it be continued this winter, must prevent any rise in this description; but as the relative proportion of the sorts grown is unknown, supplies will determine the matter. The contract for 1,000 qrs. gave boilers some improvement at the end of the month. The imports into London for four weeks were 3,074 qrs. native and 3,002 qrs. foreign, against 1,645 qrs. English and 2,290 qrs. foreign in September, 1858. The August imports throughout the kingdom were 9,455 qrs.

The linseed trade has been remarkably steady all through the month. The first week had heavy imports, but the arrivals being anticipated very slightly affected the market, and prices have scarcely varied. Cakes also, from the high prices realised for butchers' meat, have gone off well, notwithstanding the abundance of feed. The exports have been only moderate.

The seed trade has not yet opened for new foreign red or white cloverseed, prices being placed too high to attract attention here, especially in German white, in the uncertainty yet obtaining with regard to our own crops. Good prices, however, seem likely to be paid for fine white samples, and low rates for red seem improbable, unless for inferior sorts. Trefoil has rather given way. In trifolium the demand has ceased. Winter tares have been in good demand till lately, at lower rates, say at 7s. 6d. to 8s. per bush. White mustardseed seems again to have settled into dulness, the samples generally left over being grey coloured and inferior. Hempseed, rapeseed, and other seeds have been only in limited demand, at about former prices.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	Quarterns.	
WHEAT, Essex and Kent, white new	37 to 46	39 to 47	
red new	36 42	old 38 44	
Norfolk, Linc., and Yorks., red		37 45	
BARLEY, malted, new, — to 37	Chevalier, new	36 40	
Grinding	26 27	Distilling	28 30
MALT, Essex, Norfolk, and Suffolk	49 to 57	fine	60 67
Kingston, Ware, and town made	49 57		60 67
Brown	48 49		—
RYE	new	—	30 31
OATS, English, feed	31 36	Potato	36 28
Scotch, feed	32 37	Potato	36 29
Irish, feed, white	21 24	fine	25 27
Ditto, black	21 25		25
BEANS, Masagan	35 41	Ticks	36 41
Harrow	37 45	Pigeon	42 48
PEAS, new, white, boilers 40	Maple 40 42	Grey 34	36
FLOUR, per sack of 280 lbs., Town, Households	37s., fine	41 43	
Country, nominal	29 31	Households	31 35
Norfolk and Suffolk, ex-ship			29 30

FOREIGN GRAIN.

		Shillings per Quarter.		
WHEAT, Danzig, mixed 48	—	high do. —	80 extra —	53
Königsberg.....48	50	—	—	—
Rostock.....60	—	fine 53	old 54	—
American, white, 42	48	red.... 42	46	—
Pomeran., Meckbg. & Uckermark, red 47	49	—	—	—
Silesian, red.....41	46	white..... 46	48	—
Danish and Holstein.....	—	—	—	46
Russian, hard 44	45	French....40	46	white 44
St. Petersburg and Riga.....	—	—	—	42
Rhine and Belgium.....	—	—	—	44
BARLEY, grinding.....25	26	Distilling.....28	30	—
OATS, Dutch, brew, and Poland 23	27	Feed.....20	24	—
Danish and Swedish, feed.....20	24	Stralsund.....19	24	—
Russian.....	—	—	19s.	31s. 6d.
BEANS, Friesland and Holstein.....	—	—	—	37
Königsberg.....34	40	Egyptian.....35	37	—
PEAS, feeding.....35	36	fine boilers.....38	43	—
INDIAN CORN, white.....30	31	yellow.....29	31	—
FLOUR, per sack.....French 38	33	Spanish.....none	—	—
American, per barrel, sour 22	26	sweet.....	—	—

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS:	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
	a. d.	s. d.	a. d.	s. d.	a. d.	s. d.
Aug. 13, 1859	43 11	30 1	33 3	33 3	46 7	26 9
Aug. 20, 1859	44 1	31 1	35 5	30 8	44 6	27 8
Aug. 27, 1859	44 5	32 11	35 5	33 8	44 6	27 9
Sept. 3, 1859	44 0	34 3	34 5	30 11	43 5	28 10
Sept. 10, 1859	42 9	33 9	33 0	31 6	41 3	27 10
Sept. 17, 1859	41 11	35 3	31 7	30 6	40 4	28 8
Aggregate average	43 6	32 11	34 8	31 7	43 9	27 11
Same time last year	44 8	34 1	37 1	34 8	46 7	24 5

MONTHLY RETURN.

AN ACCOUNT SHewing THE QUANTITIES OF CORN GRAIN, MEAL, AND FLOUR, IMPORTED INTO THE UNITED KINGDOM, AND ADMITTED TO HOME CONSUMPTION, IN THE MONTH OF AUGUST, 1859.

Species of Corn, Grain, Meal, and Flour.	Imported from foreign Countries.	Imported from British Possessions out of Europe.	Total.
	qrs. bush.	qrs. bush.	qrs. bush.
Wheat	304508 0	56 8	304564 8
Barley	97480 5	—	97480 5
Oats	300268 0	34 7	300312 7
Rye	26113 5	—	26113 5
Peas	3889 6	1065 4	9455 2
Beans	21060 2	—	21060 2
Maize or Indian Corn	162449 1	377 0	162826 2
Buck Wheat	1198 1	—	1198 1
Bere or Bigg	—	—	—
Total of Corn and Grain	921432 4	1553 6	922986 2
	cwt. q. lb.	cwt. q. lb.	cwt. q. lb.
Wheat Meal and Flour	107842 0 4	10623 3 15	118465 3 19
Barley Meal	—	—	—
Oat Meal	5 1 0	10 0 11	15 1 11
Rye Meal	—	—	—
Pea Meal	—	—	—
Bean Meal	—	—	—
Indian Meal	286 2 24	507 2 0	794 0 24
Buck Wheat Meal	8 0 0	1 0 0	4 0 0
Total of Meal and Flour	107837 0 9	11142 1 26	118979 1 26

COMPARATIVE AVERAGES—1858-59.

From last Friday's Gas. s. d.	From Gazette of 1858. s. d.
Wheat.....112,236 qrs. 41 11	Wheat.....133,600 qrs. 44 11
Barley.....14,870 .. 35 3	Barley.....17,408 .. 36 4
Oats.....10,881 .. 21 7	Oats.....7,782 .. 25 8
Rye.....730 .. 30 6	Rye.....270 .. 34 6
Beans.....4,865 .. 40 4	Beans.....2,753 .. 46 3
Peas.....1,462 .. 38 8	Peas.....639 .. 45 1

PRICES OF SEEDS.

BRITISH SEEDS.

MUSTARDSEED, per bush, new 12s. to 16s., brown 12s. to 16s.	
CORIANDEE, per cwt.....	14s. to 16s.
CANARY, per qr.....	68s. to 70s.
TRIFOIL, new.....	24s. to 26s.
TARES, Winter, new, per bushel.....	8s. to 8s. 6d.
LINSEED, per qr., sowing —s. to 64s., crushing 64s. to 68s.	
LINSEED CAKES, per ton.....	£9 10s. to £10 10s.
RAPESEED, per qr.....	54s. to 58s.
RAPE CAKE, per ton.....	£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

CLOVERSEED, red —s. to —s.....	white —s. to —s.
TRIFOIL.....	—s. to —s.
HEMPSEED, small, 32s. per qr.....	Dutch —s. to 38s.
CORIANDEE, per cwt.....	16s. to 18s.
CANARY.....	35s. to —s.
LINSEED, per qr., Baltic 52s. to 56s., Bombay 52s. to 60s.	
LINSEED CAKE, per ton.....	£9 10s. to £11 0s.
RAPESEED, Dutch.....	54s. to 58s.
RAPE CAKE, per ton.....	£5 0s. to £6 0s.

HOP MARKET.

LONDON, MONDAY, Sept. 26.—Our market has continued brisk during the past week, with an advance of 2s. to 3s. per cwt. on Weald of Kents and Sussex; Mid and East Kents have not as yet come up in any quantity.

Our currency is as follows:

Mid and East Kents.....	90s., 112s., 140s.
Weald of Kents.....	63s., 68s., 76s.
Sussex.....	58s., 64s., 67s.

MEASE AND WILD.

WORCESTER HOP FAIR, Sept. 19.—This being our great annual hop fair has attracted numerous buyers from all parts of the country, and as the supply is seasonably good, and the quality and colour much beyond the average of years, we have had an active demand for the best description of choice Goldings and Mathon hops for immediate consumption. The colour, this, and mismanagement have also found buyers at relative values. The increasing consumption of Worcester hops by the most celebrated brewers is a proof of their being duly appreciated, and they deservedly rank in quality with the Goldings of East and Mid-Kent; but being lower in price, and co-equal in flavour, are sure to increase in the estimation of all first-class consumers. KITCHIN & CALDIOTT.

POTATO MARKETS.

BOROUGH AND SPITALFIELDS.

LONDON, MONDAY, Sept. 26.—Increased supplies of potatoes are on offer in these markets. Good and fine samples are in fair request, at full prices; but all other kinds are rather dull. Shaws are selling at from 35s. to 80s., Regents 70s. to 110s., Kent and Essex 70s. to 110s., and Scotch 70s. to 80s. per ton.

COUNTRY POTATO MARKETS.—YORK, Sept. 17.—Potatoes sell at 6d. per peck, and 1s. 6d. to 2s. per bushel. LEEDS, Sept. 20.—A good supply of potatoes, which sold at 5½d. to 6½d. wholesale, and 5½d. to 8d. retail per 21lbs. RICHMOND, Sept. 17.—Potatoes 2s. 4d. per bush. SHEFFIELD, Sept. 20.—Potatoes sell at from 5s. to 7s. per load of 18 stones. MANCHESTER, Sept. 20.—Potatoes 4s. 6d. to 8s. 6d. per 252lbs.

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s. d.	CHEESE, per cwt.:	s. d.
Friesland.....	112s. to 116	Cheshire.....	60 80
Kiel.....	—	Cheddar.....	60 82
Dorset.....	118 120	Double Gloucester.....	54 68
Carlow.....	98 104	HAMS:	
Waterford.....	98 104	York.....	80 90
Clark.....	92 104	Westmoreland.....	80 90
Limerick.....	90 100	Irish.....	70 80
Sligo.....	94 104	BACON: Wiltshire, dried 68 72	
Fresh, per dozen 11s. 6d. to 14s. 6d.		Irish, green.....	58 66

WOOL MARKETS.

BRITISH WOOL MARKET.

BERMONDSEY, MONDAY, Sept. 26.—The state of our market is remarkably healthy, the amount of business having been on

an unprecedented scale of magnitude, and this not on speculation, but merely for the supply of the regular demand of the consumers, who have had such extensive orders for the manufactured articles, that they have not been able to supply them as fast as they have been required. The export trade has been remarkably good, and there is no doubt of a continuance of prosperity to our staple commodity as improved cultivation of the soil, followed by abundant harvests in various parts of the world, and accelerated communication of distant portions of the world's population with the others, have brought about an enormously extended trade all over the world. The stock of wool in hand is remarkably small for the season of the year, and this circumstance, coupled with a good and wholesome demand, points to enhanced rates within a few months' time.

Per pack of 240lbs.

Fleeces—Southdown Hogs.....	18 10s. to 19 10
Do. Half-bred Hogs.....	18 10 19 0
Do. Kent.....	17 10 18 0
Do. Southdown Ewes and Wethers.....	17 0 17 10
Do. Leicester do.....	16 0 17 0
Sorts—Clothing, picklock.....	18 10 19 0
Do. Prime and picklock.....	17 10 18 0
Do. Choice.....	16 0 17 0
Do. Super.....	14 0 15 0
Do. Combing—Wether matching.....	20 0 21 0
Do. Picklock.....	17 0 18 0
Do. Common.....	14 10 15 10
Do. Hog matching.....	22 0 24 0
Do. Picklock matching.....	17 10 18 10
Do. Super do.....	14 10 15 10

LIVERPOOL WOOL MARKET, SEPT. 24.

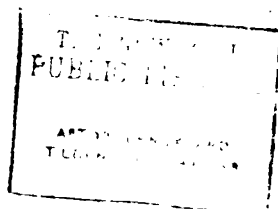
ENGLISH WOOL.—The dulness which has prevailed in the English market for some time is passing away, and business has again become more active. Prices may be quoted a little higher, and the market shows great firmness.

	s.	d.	s.	d.
Laid Highland Woolper 24lbs.....	11	6	13	0
White Highland do.....	14	6	16	6
LaidCrossed do..unwashed....	13	0	16	9
Do. do..washed.....	16	0	18	6
Laid Cheviot do..unwashed.....	17	6	20	0
Do. do..washed.....	20	0	22	0
White Cheviotdo..washed.....	23	0	40	0

FOREIGN AND COLONIAL WOOL MARKETS.

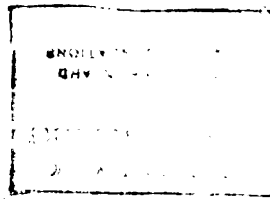
	Per lb.	s. d.	s. d.
German, { 1st and 2nd Elect.....		3 4 to 4 6	
Saxon, { Prima.....		3 4 3 0	
and { Secunda.....		3 0 3 4	
Prussian, { Tertia.....		1 8 1 10	
COLONIAL:—STONY—Lambs.....		1 10 3 2	
Scoured do.....		1 2 3 11	
Unwashed.....		0 7 1 4	
Locks and Pieces.....		0 10 1 10	
Slips and Skin.....		0 11 1 10	
PORT PHILIP—Lambs.....		1 5 3 4	
Scoured do.....		1 2 3 2	
Unwashed.....		0 6 1 7	
Locks and Pieces.....		0 8 1 10	
S. AUSTRALIAN—Lambs.....		1 8 1 2	
Scoured do.....		1 2 3 6	
Unwashed.....		0 4 1 3	
Locks and Pieces.....		1 1 1 3	
V. D. LAND—Lambs.....		1 6 3 5	
Scoured do.....		1 7 3 9	
Unwashed.....		0 9 1 6	
Locks and Pieces.....		0 8 1 10	
CAPE OF GOOD HOPE—Fleeces.....		1 1 3 3	
Lambs.....		1 2 3 0	
Scoured.....		1 2 3 1	
Unwashed.....		0 7 1 5	

BRESLAU WOOL REPORT, Sept. 22.—We had again a very lively trade, and transactions effected to the amount of nearly 2,500 cwts. The chief purchaser has been an extensive Saxon combor who for the first time visited our place, and acquired about the half of the above quantity, mostly combing wools, at from 62 to 68 shalers; the other half, consisting of fine Russian and Polish cloth wools at from 70 to 85 sh., lambs' at from 85 to 105 sh., and Charkow scoured Wools at from 90 to 100 sh., have been taken partly by home manufacturers and commissioners, partly by Berlin and Saxon wholesale buyers. Prices in general have been firmly maintained, and only lambs' Wool was to be had 4 to 6 per cent. cheaper. Fresh imports from Austria, Poland, and Russia continued to arrive on a very liberal scale, and we have lately received about 4,000 cwts.—GUNSBERG, Wool-broker.





*Mr. Davis has been a member of the Society of the Friends of the
and has been a member of the Society of the Friends of the
and has been a member of the Society of the Friends of the*





H. Hacker.

1890

1. *Phragmites australis* (Cav.) Trin. ex Steud.

THE FARMER'S MAGAZINE.

NOVEMBER, 1859.

PLATE I.

A DEVON STEER,

THE PROPERTY OF HIS ROYAL HIGHNESS THE PRINCE CONSORT.

This famous steer, bred by Mr. George Turner, of Barton, Exeter, was by Abd-el Medjid, an own brother to Abd-el Kader, out of Lady (241), by Duke of York.

Lady took a second prize at the Royal Agricultural Society's Meeting at Gloucester, a first at Carlisle, and another first at one of the Bath and West of England meetings.

The Prince's steer was never exhibited but twice. At the Birmingham Show in December, 1858, in the class under three years and three months' old, he took the first prize of Ten Sovereigns, the extra prize of Twenty Sovereigns as the best Devon in the yard, and the customary Silver Medal to the breeder. In the week following, at the Smithfield Club Show, he again took the first prize of Twenty-five Sovereigns in the aged class, of steers or oxen over three years old, with another Medal for Mr. Turner. The steer was purchased here by Mr. Petherbridge, butcher, of Hastings Street, Brunswick Square.

Although his Royal Highness has a few Short-horns and a Booth bull at one of the farms, the Devons are still the favourites at Windsor; and, as far as this illustration of the breed goes, with very good showing. Seldom has there been a handsomer beast to look at, or one that would promise to die better, than the Birmingham "best" Devon of 'fifty-eight.

PLATE II.

THE TENANT'S RIGHT.

This system of the tenant's right to compensation for unexhausted injuries is gradually coming to be more and more admitted; while it is made payable in that curious composition, a rabbit pie—"smothered in onions;" the more delicate curry; or a by no means bad imitation of hare soup. There are various recipes for getting rid of rabbits, as there are of rats and other vermin. The latest we have heard of is to give a keeper six months' notice to quit; and the amount of destruction he will contrive to commit in that time amongst his perquisites is said to be something extraordinary. However, keen ferrets, rough terriers, and lads home for the holidays ought to be able to thin them out a bit.

THE ACTION OF SOILS ON LIQUID MANURES.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The action of soils on the solid matters of liquid manure is of great interest to the farmer. The phenomena, indeed, which attend such application have long engaged the attention of the owners of water meads. The great water meadows formed in the valleys of our chalk formations are instances of this. The cultivator there remarks that the bright sparkling springs issuing from the chalk are excellent for irrigation, and that, too, as soon as they have risen from the earth. The good effect, then, of a chalk-formation spring on a soil abounding already with chalk, naturally enough seems rather unaccountable. The analysis of these waters discovers no ingredients of which the soil seems deficient. But let us proceed by steps; let us read over together the analysis of one of these chalk-formation Surrey springs. From an imperial gallon of this water, analyzed by Professor Way, were obtained :

	Grains.
Organic matter	1.74
Silica	.45
Carbonate of lime (chalk) ..	16.
Carbonate of magnesia	.47
Common salt	1.38
Sulphate of soda	.98
Sulphate of potash	.33

Total solid residue in a gallon .. 21.35

We can hardly, then, ascribe to the solid matters of this water the beneficial effects which it produces in irrigation. Still, that they do yield food to the grasses of the water-meads is evident. These springs furnish, in fact, the water for some of the most valuable meads of the chalk districts. And, moreover, the farmers of these meadows find that, when the water has been once used on a meadow, it is thereby rendered useless for irrigating another grass field. This seems to imply that the grasses of these chalk soils do find nutriment in the solid contents of the water; and this conclusion is apparently further supported by the fact observed in the valley of the Itchen, viz., that water that has been thus used up, after it has passed Winchester, and received some of the city sewage, is again possessed of its former and, indeed, increased irrigating value. Then, again, in the instance of the sewage-irrigated meads of Edinburgh, watered so copiously with such rich water, that neither the soil or its grasses can in the first application but partially exhaust it of its riches—here the liquid is again immediately applied to other meadows with the greatest advantage.

The questions, then, which have recently engaged the attention of Professor Voelcker, are most important to the holders of water meadows. And these cultivators, I feel well assured, will long continue to increase in number and in the extent of their meads. There are several reasons for this. The very rich waters supplied by the improved drainage of our densely populated places—the increasing dryness of our climate—the steady prices obtained, and the enlarging demands for meat—all tend to promote every effort to add to our supply of green food. In the Professor's experiments (and I propose merely to give in this paper one of his trials), 2,000 grains of the soil of a field belonging to the Royal Agricultural College at Cirencester, were mixed with 7,000 grains of a perfectly clear liquid manure. If we first examine the composition of the soil, and then the analysis of the liquid manure, both *before* and after it had been for 24 hours well mixed and occasionally stirred with the soil, we shall perceive what portion of the solid contents of the liquid a calcareous clay absorbed. This examination we need hardly make in other than the Professor's own words (*Jour. Roy. Ag. Soc.*, vol. xx. p. 135). When submitted to a mechanical analysis, this soil was found to contain, in 100 parts—

Moisture	1.51
Organic matter	11.08
Carbonate of lime	10.82
Clay	52.06
Sand	24.53

100.00

It appears from this that the soil in question is a calcareous clay. In wet weather it is very sticky and stiff; worked in dry weather it breaks up in hard unmanageable lumps. By autumn cultivation its physical properties have been considerably improved. A portion of the soil, taken from a large well-prepared sample, yielded, on being submitted to chemical analysis, the following results :

Moisture	1.51
Organic matter and water of combination ..	11.08
Oxides of iron and alumina	14.25
Carbonate of lime	10.82
Sulphate of lime	.71
Magnesia	.51
Potash (in acid solution)	.32
Soda (in acid solution)	.05
Phosphoric acid	.10
Insoluble silicates and sand (chiefly clay) ..	61.78

101.13

The remarkable changes which took place in the composition of the original liquid when left in contact with the Cirencester soil will appear by the subjoined tabular statement, in which the composition of the liquid manure before and after contact with the soil is given, and which also states the gain or loss in the several constituents found in the filtered liquid. In this table the gain is expressed by the sign +; the loss by —.

Composition of Liquid Manure before and after Filtration through Soil.

	Before contact with Soil.	After contact with Soil.	Gain or Loss.
An imperial gallon contains:			
Water and volatile ammonia compounds	69,888.14	69,886.60	—1.54
Containing—			
Ammonia, as carbonate and humate of ammonia ..	(85.58)	(20.81)	—14.77
Organic matters	20.59	84.77	+14.18
Containing nitrogen ..	(1.49)	(1.84)	+ .35
Equal to ammonia	(1.81)	(2.23)	+ .43
Inorganic matters	(91.27)	(78.63)	—12.64
Consisting of—			
Soluble silica	2.34	.70	—1.64
Oxide of iron	none	2.55	+2.55
Lime	11.48	22.42	+10.94
Magnesia	2.87	1.17	—1.70
Potash	16.93	3.40	—13.52
Chloride of potassium ..	2.74	none	—2.74
Chloride of sodium	40.35	33.31	—7.04
Phosphoric acid	4.83	.60	—4.23
Sulphuric acid	3.94	2.98	—1.06
Carbonic acid and loss ..	5.80	11.60	+5.80
	70,000.00	70,000.00	

Lime, it will be noticed, was rendered soluble by the liquid manure left in contact with the soil. An imperial gallon contained nearly eleven grains more lime after than before filtration.

It is worthy of notice that the liquid originally contained no oxide of iron. Left in contact with the soil, it dissolved 2.55 grains per gallon.

The small proportion of potash left in the manure after contact with the soil, is particularly interesting, inasmuch as it shows that the soil not only possesses the power of absorbing ammonia, but also potash—a constituent which in an agricultural point of view is of the greatest importance. It appears that potash is retained by the soil even with greater avidity than ammonia.

In a much minor degree than potash, the soil absorbed chloride of sodium. The power of soils to absorb potash, then, presents us with a striking contrast to their apparent indifference to absorb soda from its soluble combinations.

It is likewise (adds Professor Voelcker) satisfactory to have in this experiment a direct proof of the power of the soil to take up phosphoric acid from soluble combinations with which it is brought in contact. Nearly the whole of the phosphoric acid originally contained in the manure was taken up by the soil.

Although it is quite true that nearly the whole of

the phosphoric acid contained in a liquid is retained by a moderate quantity of soil, it cannot be inferred from this that plants take up phosphoric acid in the shape of an insoluble compound; for a soil which is capable of absorbing a large quantity of phosphoric acid, when brought in contact with a liquid containing but a small proportion of the amount of phosphoric acid which the soil is capable of retaining, never completely removes the phosphoric acid. A certain quantity remains in solution—a quantity which I believe is sufficient to account for all the phosphoric acid which is found in the ashes of plants.

In all probability it is the function of the soil to transform readily soluble compounds of phosphoric acid into combinations which are so little soluble in water that in common life they pass for insoluble, but which are still sufficiently soluble to supply the growing plant with the necessary amount of this kind of mineral food. This beautiful power of soils effectually prevents the waste which heavy rains infallibly would occasion.

Other experiments of a similar kind were made by Professor Voelcker—viz., with the soil from a permanent pasture, from a fertile soil, and from a poor sandy field.

The sandy soil was found to possess in a very weak degree the power of absorbing ammonia or potash from the liquid manure. But it absorbed a considerable proportion of lime. Phosphoric acid was also absorbed, but to a less extent than by the clay soil.

One important fact to be gathered from the experiment with a poor sandy soil is thus briefly alluded to by the professor:

“In the preceding experiments we have seen that liquid manure kept in contact with soil becomes much richer in lime. But in the case of the sandy soils, instead of lime being taken up by the liquid manure, a considerable quantity of the carbonate of lime contained in the liquid used in the experiment was actually removed by the soil. The amount of lime in this soil is evidently insufficient to supply the wants of the crops we cultivate on the farm; it is, therefore, fortunate that a soil thus constituted possesses the power of depriving manuring mixtures of those constituents which are required in considerable quantities for sustaining a healthy growth of plants. This property of soils to store up food for plants is not confined to one particular kind of fertilizing matter, but it applies to all, and manifests itself in different ways. In most cases special power exists in soils to remove ammonia, potash, and phosphoric acid from liquid fertilisers brought in contact with them; and less important and more abundant materials pass into

the liquid that drains from soils. But this order is reversed if liquid fertilizers act upon such soils as the one used in the experiment before us. Here lime, a cheap and usually abundant ingredient of soils, is actually absorbed from liquid manure, and retained in a soil which is peculiarly deficient in lime. Experience has shown, moreover, that sandy soil is more benefited by lime and calcareous mixtures than by any other description of manure."

The large quantity of liquid which the pastures on sandy soils will beneficially absorb is well known to the irrigator. The inability of such soils to retain either ammonia or potash evidently renders necessary (to furnish an adequate amount of these for the grasses) a more extended and a more frequently renewed supply of these in liquid manure.

Upon the whole, the Professor considers that the following points of interest have been determined by his experiments, viz.—

1. Liquid manures, in contact with soils, undergoes a number of chemical changes.
2. These changes are greater in the case of clay and calcareous soils than in the case of sandy soils.
3. Passed through clay, loamy, and calcareous soils, liquid manure leaves a considerable quantity of ammonia in the soil.
4. Under the same circumstances, liquid manure parts likewise with potash and phosphoric acid.
5. Sandy soils remove from liquid manure but little ammonia, and likewise not much potash.
6. With the exception of purely sandy soils, liquid manure, as used in practice, leaves the greater portion of all the most valuable fertilizing matters in the generality of soils.
7. The comparative power of different soils to remove ammonia, potash, and phosphoric acid from liquid manure differs greatly.
8. Liquid manure passed through sandy soils rich in soluble silica takes up soluble silica.
9. Soils that absorbed much ammonia also absorbed much potash, and the soils which absorbed little ammonia also absorbed little potash.
10. Soda-salts (common salt) are either not at all removed from liquid manure or only to a small extent.
11. Chlorine, and generally sulphuric acid, remain unaltered in quantity in liquid manure passed through different soils.
12. In most cases, liquid manure left in contact with different soils becomes richer in lime.
13. The proportion of lime which liquid manure takes up from the soils with which it is brought in contact does not altogether correspond with the relative proportions of lime in the different soils.

14. Liquid manure, passed through a sandy soil greatly deficient in lime, became poorer in lime : thus showing that the property of soils of storing up food for plants is not confined to ammonia, potash, or phosphoric acid ; but that it is a property which manifests itself in a variety of ways. Thus, soils rich in lime yield this substance to liquid manure ; soils in which lime is deficient may abstract it from liquid manure. Again, potash usually is removed from liquid manure left in contact with soil ; but, in particular cases, liquid manure may even become richer in potash after filtration through soil.

15. Very soluble saline fertilizing compounds are probably injurious to vegetation when supplied too abundantly to the land.

16. All moderately fertile soils have the power of rendering the more important soluble fertilizing matters much less soluble ; but in none of the experiments were ammonia, potash, phosphoric acid, and other compounds that enter into the composition of the ashes of our cultivated crops, rendered perfectly insoluble.

17. It does not appear probable that plants take up mineral food from the soil in the shape of totally insoluble combinations.

It is difficult to assign too high a value to investigations like these of Professor Voelcker. It is always satisfactory to understand the action of fertilizers, and more especially of those in a state of solution. I have already referred to some of the reasons why it is most probable that the use of these will be very materially increased, and there is every reason to conclude, from the experience of the Belgian farmers, that the *preparation* of liquid manures, especially those containing chiefly organic matters, will hereafter be a profitable object of the farmer's attention. The more general introduction of agricultural steam engines will much promote the use of these fluid manures, since the steam engine raises the requisite supply of water, in most situations even from some depth below the surface of the land at a very small cost. The expense of procuring the water hardly presents a bar to its extended and profitable employment in irrigation.

The amount of water which an ordinary agricultural engine is capable of raising is much more considerable than is commonly understood. Suppose we have to raise the water from a stream to the highest part of a field—say, 10 feet above the level of the river—an ordinary engine would, by the consumption of one cwt. of coals, raise to this elevation about 700 tons of water—an amount of liquid equal to an inch depth on seven acres of land, or an average fortnight's rain in the southern and midland English counties.

WATER—ITS DIFFERENT QUALITIES AND EFFECTS.

Dr. Franklin used to observe that the only animals created to drink water were those which from their conformation are able to lap it on the surface of the earth. Although we do not rank under the banners of George Cruikshank and his total-abstinence friends, we are free to admit that there are seasons and localities when a cool draught of spring water is a very refreshing beverage; and no doubt the axiom of Professor Johnston may be admitted in its full extent, that the water we drink is next in importance to the air we breathe. It forms three-fourths of the weight of living animals, is the most abundant substance we meet with on the face of the earth, and covers to an unknown depth at least three-fourths of its entire surface. What with the drinking-fountains opened here and there in the metropolis and provincial towns by philanthropic individuals and corporate bodies, and the discussions now going on in the public journals as to the purity of water, the subject is making as much noise as the Great Eastern. Although it can scarcely be affirmed in the words of the ancient mariner, that there is "Water, water every where, and not a drop to drink," the subject is prominent, and not undeserving of a passing notice.

For instance, the metropolitan loungers and sight-seers, and the thousands of visitors to the South Kensington Museum, are edified and enlightened by the sight of a dozen or more huge glass jars arranged by Dr. Lankester, containing specimens of Thames water, taken at various points from Southend to Thames Ditton, to show the influence of the sewage of London in rendering the water unfit for drinking purposes; and even the specimens of water from the comparatively pure surface wells of the parish of St. James, Westminster, show large quantities of organic matter. A man, we are told, must consume a certain amount of dirt in his lifetime; and whether it be contained in his food or his drink, we suppose matters little. But we certainly prefer to have it disguised.

Surface-well waters are most abundant in organic matter, which is derived from soaking through the soil, which is permeated with house drainage, &c. This organic matter arises to some extent from the decomposition of animal and vegetable substances, either growing in the water or cast into it; and when it putrefies, may render the water in which it is present very injurious, and even fatal in its effects. But yet, after all, may we not doubt the correctness of the popular idea that the maintenance of the health depends very much on the quality of the water. For example, we see all sorts of animals—herbivorous, graminivorous, and carnivorous—often supplied only from a green pool or horse-pond. In fact, such a place is usually preferred for the use of all domestic animals; and wild animals generally prefer stagnant pools. Man, too, though

compelled to drink water of the most different qualities, yet does so without detriment to health. Some are compelled to drink what is called "hard water," and others "soft water"; and each comes to like that which he is accustomed to, and objects only to a change. The inhabitants of Suez prefer their own brackish, bitter water to the fresh water of the steamers, and yet it does not injure their health. The water taken on board ship, for the first fortnight or three weeks emits a putrid smell, from the death of insects and plants in it; and yet it does not produce sickness. The water in the neighbourhood of mineral or chalybeate springs is more or less tainted with the salts or gases which give those springs this peculiar taste; and yet the residents drink, and enjoy it. And even the mud-hole of Australia furnishes the only, and not an unwholesome, drink for aborigines and travellers in that country. Nay, more, we impregnate with the most deleterious gases water and other fluids intended for beverages and medicinal purposes. Thus soda-water, lemonade, ginger-beer, champagne, and ale, are considered good, just in proportion to the large quantity of carbonic-acid gas they contain. Many mineral waters, and their artificial imitations, contain sulphuretted-hydrogen gas, which gives them a smell of rotten eggs, and is the cause—when mingled with the atmosphere, and breathed—of the worst forms of fever on the coast of Africa and elsewhere. In like manner lime and iron (which all ordinary water contains) are administered medicinally in water.

The explanation of these facts is easy. What would be deleterious if breathed—that is, carried with air into the lungs—is useful when taken into the stomach, because the lungs are the organs for getting rid of such things after they have served their purpose in the body; whilst the stomach is the organ to receive them for the nourishment of the body. It may, then, be affirmed that pure water would be unwholesome—that is, water without the salts and gases which it generally contains; and for this reason—that the animal body requires for its proper nourishment lime, iron, sulphur, phosphorus, &c.; and in no form can these be presented to it so suitably, and in such infinitesimal dilution, as that in which they exist in water. Water may, however, become impregnated with these things to a degree in which it would, if drunk, be injurious to health; just as the atmosphere, which is generally in the fittest state for the support of life, may, from accidental or even natural causes, become overloaded with noxious gases. But as Providence has furnished the means of purifying the atmosphere by currents, rain, and heat, so also has Providence taken care that there shall be means for purifying the other essential—water. The earth is the great purifier, deodorizer, and disinfectant. As rain falls, it carries with it ammonia and other gases con-

tained in the atmosphere. When it reaches the ground, it also mingles with the animal and vegetable matter it finds there, and holds much of it in suspension or solution. The water sinks through the surface, and, as it descends, is rapidly purified from most of this foreign matter by the earth, which thus acts as a filter. So rapidly does this purification or filtration take place, that little or no impurity passes farther than a foot or so downwards.

All rain-water does not, however, sink into the earth; a considerable quantity of it runs along the surface, carrying impurities of all sorts with it into streams, pools, and such receptacles. Here, then, it has to be purified for the use of the fish that inhabit the water, and of the land animals that drink it. This is done partly by the insects and other creatures that teem in all water, and immediately convert the dead animal matter it contains into their own living tissues, and partly by the vegetable life that universally pervades it. It is a popular error to speak of water, undergoing this two-fold process of purification, as being in a state of putrefaction; or to suppose that green, stagnant water is unhealthy. The fact is, that putrefaction is thus arrested, and the green colour is imparted by the luxuriant vegetation of the most beautiful and minute plants. These plants, too, are not poisonous, and therefore are drunk in with the water by herbivorous, graminivorous, and carnivorous animals, without detriment, as already noticed. The process is this: A pool, for example, is filled with muddy rain-water; the heavier impurities, sand, &c., subside, and in a few days the whole assumes a greenish hue by the germination of seeds of minute water-plants, which have the power of retaining their vitality (like the spores of fungi on land) through heat or cold, drought or moisture, until the favourable and useful time for their development arrive. They then shoot forth into activity, and the intensity of their verdure depends upon the quantity of suitable nourishment they find in the water, just as the luxuriance and colour of cultivation depends upon the quantity of manure the soil contains. By degrees the pool becomes less and less green as the water is deprived of the nourishment it affords to the plants, until they die of inanition (as plants exhaust soil, and cease to flourish or live), and the water, if undisturbed or un replenished by foreign matter, becomes transparent, and thus fit for the habitation of the higher orders of fishes, and the use of the highest orders of land animals, including man.

Speaking of the water we drink, in his "Chemistry of Common Life," Professor Johnston remarks: "In Nature, water is never found perfectly pure. That which descends in rain is contaminated by the impurities it washes out of the air; that which rises in springs, by the substances it meets with in the earth itself. In rivers the impurity of the water is frequently visible to the eye. It is often of a red colour as it flows through rocks of red marl which contain much oxide of iron in their composition; it descends milky from the glaciers of Iceland and the slopes of the Andes, because of the white earth it holds in suspension; it is often grey or brown in our muddiest English rivers;

it is always brown where it issues from boggy lakes or runs across a peaty country; it is sometimes black to the eye when the quantity of vegetable matter is excessive, as in the Rio Negro of South America; and it is green in the geysers of Iceland, in the Swiss lakes, among the islands of the South Sea, and around our own islands, because of the yellow matters which it everywhere holds in suspension or solution."

While, we trust, we have in the foregoing remarks succeeded in removing some of the bugbears that are floated about, to alarm the uninformed, respecting the impurities and unwholesomeness of water, there is no reason whatever why water intended for domestic use should not be freed or cleared from the grosser impurities with which it is charged, and rendered more agreeable to the eye. A ready method of obtaining a knowledge of the comparative organic impurities of water is the addition of the permanganate of soda or potash. This salt, which gives to water a beautiful red colour, is easily decomposed by organic matters.

When the same quantity of the permanganate is added to a series of waters containing organic matters, those which contain the least retain the most colour, and *vice versa*. The passing water over iron has been found to have a remarkably purifying effect; and this has been patented by Dr. Medlock. The best remedy for impure water is filtering, which may be done by passing the water through charcoal and sand.

Man generally desires to gratify both the eye and the palate in drinking water, and therefore prefers taking the water from a well rather than a pool, whether green or transparent; hence he digs a hole in the earth, and thereby avails himself of this great natural filter; or, if necessary, he makes an artificial one. Still, however, the water contains the seeds of water-plants; for, from whatever depth it may be taken, it will, if kept in a bottle, become green in a few days. That it also contains living creatures in great abundance is manifested by the offensive smell which the best water shortly assumes, owing to their death and putrefaction when transferred from their natural place in a well to a jug or other vessel. But besides these, the water, however filtered, still contains the gases and salts which, as above explained, render it wholesome.

However useful the contact of iron may be in rendering water wholesome, lead is, on the contrary, most obnoxious; and the leaden cisterns in such general use in towns, unless occasionally scoured out, accumulate a vast amount of injurious deposit. This branch of the subject has lately occupied a large share of attention among medical men, and we notice that a very important paper by Dr. Lindsay, of Perth, "On the Action of Hard Waters upon Lead," was read at the recent meeting of the British Association, and which is published *extenso* in the *Journal* of the Society of Arts. Dr. Lindsay's experiments tend to show that it is the soft or rain-water that has the most pernicious effect in decomposing the lead; hard waters being far less active in their operation upon the metal.

FEEDING OF STOCK AS A BRANCH OF FARM MANAGEMENT.

A lecture delivered to the members of the Highland Society during the Edinburgh Show week.

Dr. ANDERSON said: The feeding of stock, and its relation to the general management of the farm, is a subject of the very highest practical importance, and one of those in which definite information is most essential; and yet there is probably no branch of agricultural practice in which more difference of opinion exists; so much so, that while one class of persons believe it to be a highly remunerative department of farming, others with equal confidence maintain that cattle are chiefly valuable as mediums for the manufacture of manure. Even regarding details much doubt exists, and there are really but few points in which absolute unanimity exists. Looking at the magnitude of these differences, it was not without some diffidence that I ventured to select it as the subject of my address on the present occasion. Those matters, however, in regard to which doubts and differences of opinion exist, are, on the other hand, specially suited to discussion, for it is incumbent upon us to sift our information, and to ascertain what can be relied upon and what requires to be elucidated by further experiment. When this is done, it appears that there are many points on which we are very imperfectly informed, and others on which statements of the most conflicting nature have been made; and the difficulty of drawing conclusions is enhanced by individuals maintaining the exclusive excellence of the systems they themselves practice, and insisting that, because they have been led to adopt a particular opinion, their neighbour who holds the opposite one must necessarily be wrong. A great point is gained when we admit that both may be right, and when we set to work cordially to trace out the cause of the discrepancy. All branches of agriculture are now going through this phase of their existence, and principles are being gradually established. The feeding of stock is exactly one of those subjects which can be most successfully advanced by studying the principles on which it depends; and, though these involve many most complex chemical and physiological questions, we have obtained some foundation on which to go. The food which an animal consumes is partly assimilated and partly excreted; but, if it be properly proportioned to its requirements, its weight remains constant, and hence we learn that the food does not remain permanently in the body. If, now, an animal be deprived of food, it loses weight, owing to the substances stored up in the body being used to maintain the process of respiration and the waste of the tissues. The course of events within the body is, so far as known, somewhat of this kind: the food is digested, absorbed into the blood, and deposited in the form of flesh and fat in the body, a certain quantity being consumed to support respiration. If the food be properly adjusted to the requirements of the animal, its weight remains unchanged; the quantity absorbed and that excreted exactly corresponds to one another; but, if we increase the food, a part of the excess will be deposited in the tissues and add to its weight. Now the quantity absorbed depends upon the state of the animal—a lean beast thoroughly exhausting its food, while when it is nearly fat it takes only a small proportion. So, likewise, if the quantity of food be greater than the digestive organs can well dispose of, a certain quantity escapes digestion altogether, and is practically lost. The problem which the feeder has to solve is, how to supply his cattle with

such food, and in such proportions, as to ensure the largest increase with the smallest loss. In solving this problem we must, in the first place, consider the general nature of the food of all animals, the constituents of which may be divided into three great classes; the nitrogenous matters, which go to the formation of flesh; the saccharine and oily, which support respiration and form fat. It is sufficiently obvious that as the two great functions of nutrition and respiration must proceed simultaneously, the most advantageous food will be that which supplies them in the most readily assimilable forms, and in proper proportions. In regard to the first of these matters, it will be obvious that if two foods contain the same quantity of nutritive matters, but in one they are associated with a larger quantity of woody fibre or other non-nutritious matter, the latter will have considerably less value than the former. The necessity for a proper balance of the two great classes of nutritive constituents is also sufficiently obvious: for if, for example, an animal be supplied with a large quantity of nitrogenous matters, and a small amount of respiratory elements, it must, to supply a sufficiency of the latter, consume a much larger quantity of the former than it can assimilate, and there is practically a great loss. We may determine the proper proportion of these substances in three different ways: 1st, we may determine the composition of the animal body; 2nd, we may examine that of the milk, the typical food of the young animal; and 3rd, the results of actual feeding experiments may be examined. The composition of the animal body is a subject on which, as it appears from the recent experiments of Lawes and Gilbert, great misapprehension has hitherto existed. It has always been supposed that by far the larger proportion consisted of nitrogenous matters; but that is quite an error, and, even on lean animals, the fat greatly preponderates over the lean. A lean sheep, for instance, contains one and a half-pound of fat for every pound of dry nitrogenous matter, and when very fat it may contain six times as much fat as lean. The inference obviously is that the food must contain a very large quantity of non-nitrogenous matters. The milk, which contains a number of each of the three great classes of nutritive matters, also affords us instruction, although, of course, more especially as regards the feeding of young stock, when the conditions are different from those existing in the mature animal. But, however valuable the data derived from these experiments may be, they are less important than those derived from actual feeding experiments. In fact, it by no means follows that the proportions in which the different substances are found in the animal are exactly those in which they ought to exist in the food. On the contrary, it appears that while one-tenth of the saccharine and fatty matters are assimilated by the animal, only one-twentieth of the nitrogenous compounds, and one-thirty-third of the mineral substances in the food, are assimilated by the animal. On the other hand, however, it must be remembered that the particular compounds also exercise a very different influence. Thus a pound of fat in the food, when assimilated, will produce a pound of fat in the animal; but it requires about two and a-half pounds of sugar or starch to produce the same effect. The broad general principle arrived at is, that we must afford a sufficient supply of readily assimilable food, containing a proper pro-

portion of each class of nutritive substances. But there are other matters also to be borne in mind, for the food must not only increase the weight of the animal, but also support respiration and animal heat; and the quantity of food required for this purpose is large. It appears, from Bouscington's experiments, that in a cow eighteen ounces of nitrogenous matters are required to counterbalance the waste of the tissues—a quantity contained in about ten or twelve pounds of wheat flour; and it is well known that an ox expires four or five pounds of carbon daily, to supply which one hundred pounds of turnips are required. We see from this the large quantity relatively to that used up which is required for the maintenance of these functions, and the importance of adopting such measures as, by restraining them within the narrowest possible limits, produce a saving of food. The diminution of muscular exertion, and keeping the animals warm, so that a small quantity of food may be required to act as fuel to maintain the animal heat, are the most important considerations. Although the presence of a sufficient quantity of nutritive matters is an essential qualification of all foods, their mechanical condition is not unimportant, for unless its bulk be such as to admit of the stomach acting upon it properly there must be an appreciable loss; and

there is no greater fallacy than to suppose that the best results are to be obtained by the use of those which contain their nutritive matters in a very small bulk. As a practical question, the principles of feeding are restricted to determining how the staple food produced on the farm can be most advantageously used to feed the cattle kept on it, and on this point much requires to be said. It appears that they can be best made use of when combined with more highly nutritious food, such as oilcake or rape; and when this is properly done, a very great advantage is derived. It appears from experiments that sheep, which, when fed on hay only, attain a weight of ninety pounds, reach a hundred when rape is added. The subject cannot be completed without referring to the value of the dung produced, which has been very variously estimated. The experiments referred to in the course of the address appear to show that, of food generally, about one-third to one-fourth of the money value, and seven-eighths of the valuable matter, appear in the dung. Dr. Anderson concluded by saying, that he had by no means attempted to exhaust the subject, but had given only a sketch, trusting that the observations of others might fill up the details.

THE HEREFORDSHIRE AGRICULTURAL SOCIETY:

MEETING AT HERFORD.

There was rather a determination of the body agricultural to the Great Western line in the early part of last week. On Tuesday, Oct. 18, the editor of one of our national herd-books was poising his glass over the heads of certain well-bred stock at the Swindon Station. On the very same day, a little further on, the editor of another herd-book was flourishing his baton as the director of an agricultural meeting. Each of course was associated with his own favourite breed. Mr. Strafford sold Shorthorns, and Mr. Duckham placed Herefords; and never did men keep their line more religiously. One of the white faces would have been no more out of place in the Uffcott catalogue than a Durham would have been in the Hereford cattle-market. And this same cattle-market had a double duty to perform. On the one day it was the show-ground of an agricultural association, and on the next, more legitimately, the focus of a great cattle-fair. The two, however, are very intimately connected. In fact, the show and the fair both in reality open to the public at the same time. On the Wednesday morning all the main streets of the city were crowded with beasts, salesmen, breeders and buyers. Nowhere else could such a scene be commanded. It was one continual throng, or drove, or group of cattle, but all of the same uniform stamp and character. To the stranger, indeed, it became somewhat of a question whether, if an animal did break away from his own lot, his owner would ever be able to identify him? At almost as early an hour an exhibition of precisely similar constituents was opened under the auspices of the Society. It was still the well-known red-and-white beast, with his fine frame, famous forehead, good touch, noble head, and

placid eye. But any uniformity, at least of excellence, closed here. It was generally declared that there were *fewer* good animals in the fair and *more* in the show than was ever known before. The breed as a whole was badly represented, worse than it has been for many years past; while, on the other hand, the individual specimens of the sort were as manifestly superior. So apparent a paradox is yet susceptible of some explanation. The Hereford cattle fairs, we fear, are gradually becoming something very much on a par with the great Yorkshire horse fairs. That is to say, the best part of the fair is over before the fair begins. Men have their agents, who go round and pick up the choice lots for weeks previous. It is well known that some of the leading salesmen have been doing so this season, and even "the remainder" have come more and more into the hands of the dealers. It may be argued, of course, that the Herefords are looking up when so much anxiety is evinced to obtain them, and certainly the result of this year's fair went far to confirm any such impression. Moderate as was the sample offered on Wednesday, it is long since better prices were commanded. But the midland counties men, who come to buy for themselves, shook their heads dubiously, and only trusted the markets would continue to warrant it.

But we have turned up our trousers, and gone unscathed amongst these mild-eyed, good-tempered, pale faces; although crowding and elbowing each other at every step. That fine-spreading horn, if you do discover it arm-in-horn with you, has no notion of wrong. This poor bewildered steer would rather get out of your way than into it; and that group of martyrs are sighing only for more room and quiet in the flying

pastures of the Shires. Let us not add to their discomfort by handling, or drawing, or crabbing them; for we are really not buyers to-day, and if we do put a hand in our pocket, it is merely to pay our shilling and see the show. It is fair time; so walk up, if you please, and see the lions! and we walk in accordingly to see—more pale faces, more fine spreading horns, more of the venerable ox-eyed expression that the poet of old paid as a compliment to his goddesses. If one went to Newmarket to see horses, or to Chiswick for flowers, or to Lewes for Southdowns, one as assuredly goes to Hereford to see Herefords and nothing else. The Hereford show is essentially a show of Herefords. There was not a beast of any other breed in the yard, and it would certainly have been a more complete, a better, or a more perfect exhibition, had there been nothing else to see. But there were classes for sheep and for pigs and for horses, not one of which was up to the average merit of a county show. The sheep included a few fair Cotswolds, some dark-faces, and dubious Shropshire downs, and more crosses with the old favourite Ryeland sheep of the district. There was not a really good horse in the entry, and only two cart-stallions shown, with as rough a lot of mares as could be reasonably collected. Then the fame of Herefordshire and Shropshire, as the nursery-ground of good hunters, must be surely fast dying away, as we were told it is. Farmers no longer ride and then breed from the seventy or eighty guinea mare they once had such a pride in, and poor Mr. Vevers has been dead some years. The judges must have had a curious estimate of a clever hack-mare to distinguish the animal they did, but honestly they had not much to select from. They were happier in their choice of the three-year-old hunting-filly, and had the courage to withstand the mere condition shown against her. Her chief opponent, however, had a pedigree good enough for a Derby winner; but she had all the better of him in the matter of looks and promise. The pigs might have been all put into a parish pound, and there were some of them hardly worth taking out again if they only once did get there. But the prize Hereford stock—that was the point. If they were but a rough lot in the fair—if we could never depend upon them at our great national meetings, but found just a few one year and scarcely any the next—if they actually had been improving of late—as some people said—and if it was really worth while for Mr. Duckham to persevere with the herd-book—here must be the proof: and here, too, *was* the proof. The home-breeders themselves confessed they had never known such a show of them before; and certainly, with all our experience of the Shorthorns in Yorkshire, and the Devons in their own native county, we never witnessed a distinct race of animals, exhibited in such numbers, with so much uniform excellence, and general characteristics of their kind. The strength of whole herds, moreover, was called for. There was scarcely an exhibitor that depended upon any one picked animal or so. The very rules and conditions of the Society are somewhat peculiar in this respect. It offers a series of premiums not merely for a bull, but for a bull, a cow,

and their *produce*, all in one entry. It stipulates for breeding cows to be shown in lots of twos, threes, fours, or fives, according to the sizes of a man's holding. Feeding beasts are got together in the same way, and there are prizes for "pairs" of heifers and steers of every possible age they could enter at. Indisputably, there never was a fairer way of testing what a herd, or even a breed was equal to. Still, if an exhibitor had but one animal or so, he cared to send, there was every opportunity for him; and Mr. Hill showed Claret in this wise, as did Lady Emily Foley her fat cow. The demand, however, for numbers was readily responded to. In the opening or "Happy Family" class of father, mother, and child, there were no less than nine entries, every one of which was commended. That staunch friend to the Herefords, Lord Berwick, took very becomingly the first place with Severn, the second prize bull at Warwick, his companion Beauty (well named) having also been the second cow at the All England Meeting. Then another nobleman, Lord Bateman, had the third honours with the even better known Carlisle, shown in more workmanlike order than he hitherto has been; but the lovely Thais by his side was terribly out of form, or the two might have been further distinguished. The other trios were not so celebrated, at least out of the neighbourhood, but they well merited the passing compliment paid them, and it is a question whether other societies might not adopt so interesting an illustration of a breed or a herd. It took amazingly here. The other more famous animals came naturally in the all-aged class, where Mr. Williams' Sir Colin and Mr. Hill's Claret met once more. The latter was the conqueror at Chester, Warwick, and at Hereford last year; but Sir Colin has now the turn, and beat the "black 'un" at Ludlow very recently, as well as on their present meeting. There is no doubt the colour of Mr. Hill's bull goes against him with those who stand up very legitimately for the points, and, as we noticed when we last saw him, he is growing patchy. Sir Colin was clearly the favourite here, and he is certainly a very grand beast, with a beautiful line along the back, and as level as a die. But, like his opponent, he does not look so well from behind, although the fault be not quite in the same place. He stands "in" a bit, and rather droops in the carcase. Clearly the grandest, handsomest, and the bull of the highest Hereford character, was Lord Berwick's Severn, which stood above Sir Colin at Warwick, but only next to Claret. The one strong class of the show however, was that of the yearling bulls, of which there were no less than three-and-thirty entered; Mr. Price sending five, Mr. Rea, of Westonbury, five, Mr. Turner three, Mr. Perry two, Mr. Williams two, and Lord Berwick, Lord Bateman, Mr. Clive, Mr. Hill, and Mr. Duckham being also amongst the exhibitors. The judges made one of the youngest of the lot the first prize, and put Mr. Perry with another Goldfinder second to him. They had both numerous admirers, and Mr. Price's is very high-bred in appearance. But both the public and the judges commended the whole entry, and there were continued nibbles and bids for something or

other, the Australians through their agents Messrs. Cardwall and Strafford, evincing far more desire than usual to have something good. Mr. Coleman was also a ready buyer for his Grace the Duke of Bedford, and sixty, seventy, and so on were offers that might have been commonly had. Mr. Cardwall ultimately secured Mr. Price's prize yearling for something over a hundred and twenty, and another unnoticed one of Mr. Clive's for eighty. But it was in the next section of two-year-old bulls, that the value of the Herefords came to be appreciated. The two o'clock sale on Wednesday certainly opened very languidly; but the appearance of the deep, weighty, fleshy Salisbury did much to revive it. There were many ready to go to beyond a hundred. At twice that, the auctioneer took off his hat and gave a cheer, eventually dropping his hammer to Mr. Price, of Pembridge, at two hundred and twenty-five guineas. Salisbury was second best at Warwick, and Leominster, the second to him here, third. In fact, in the heifer and some other classes the "Royal" awards were very generally confirmed. The first prize two-year-old Hereford at Warwick, Mr. Naylor's Adjutant, was "bound" straight from there for Australia at three hundred and fifty; so that Salisbury, by any estimate, still ranks only as next best to him.

The heifer pairs were quite worthy of the young bulls, and the judges commended the classes of both yearlings and two-year-olds, in which Lord Bateman, Mr. Price, Mr. Clive, Mr. Rea, Mr. Turner, and Mr. Williams had some beautiful things. Mr. Price's pair of two-year-olds were amongst the "picks" of the show, with lovely heifer heads, as beautiful bosoms, famous backs, and that "fleshy" handling a Hereford man appreciates so much. Then there were whole ranges of breeding cows exhibited in honest useful condition, and in themselves quite a sight to see. There were nine competitors for the twenty pounds which the good citizens of Hereford made offer of; and Mr. Goode sent five, Mr. James Davies six, Mrs. Turner seven, Mr. Hewer two, the Rev. Mr. Clive *twenty-two*, Mr. Rea six, Mr. Thomas Davies eight, Mr. Price, of Pembridge, five, and Mr. Taylor eleven, each in accordance with his acreage. The judges placed Mr. Rea first, Mr. Price second, and highly commended the whole lot of over seventy! So much to the credit of the breeders, and they all looked as if they did breed. But then, alas! the Chairman of the dinner declares they will not milk. "It will take some time to 'develop' his premium for the best milk cow," and this year against the seventy-two breeders, there were only three milkers entered, and these, by two exhibitors—Mr. Price and Mr. Duckham. Is this the weak place in the Herefords after all? And are we only to see a Hereford cow in perfection, when she is fed up like that extraordinary one of Lady Emily Foley's? Seldom has any animal united *immense* size with so much beauty and symmetry. She has a really perfect head, and to stand by, either for the evenness with which she has fed, or the ground she covers, this is really a wonderful cow. If anything she is hardly *thick-fleshed* enough for some of the connoisseurs; but our readers will have the opportunity of

judging for themselves, as her Ladyship has entered her prodigy at both Birmingham and the Smithfield Club.

It is only within the last few years that the Herefordshire Agricultural Society has assumed anything of that fitting influence and importance it now enjoys. The meeting long struggled on as a merely local gathering, or indifferent "tag" to the fair itself. The association owes much of its present position to the fostering care of that excellent county paper the *Hereford Times*, backed by the judicious direction of Mr. Duckham, and the services of a committee of practical men. The very vice-presidents are farmers and breeders in the county. Almost contemporaneously with an improvement in the society has been that in the stock. The leading London salesman of the day told us here that for the last three or four years he had noticed a much better sort of Hereford, while our own experience goes to date an advance to very much about the same period. In somewhere about 'fifty-five the breed really appeared to be going quite out of fashion; that is as national prize stock; but since then there has been a considerable reaction. The white faces and early maturity have been the great thing aimed at. However successfully this has been achieved, it has been obtained, in the opinion of some sticklers for former times, at the loss of much of that thick or heavy flesh which so pre-eminently distinguished the mottle-faced tribes. Indeed, perhaps, after all, the old Hereford was the grander beast of the two, providing always you gave him "time" to develop and furnish. But that is just what at present we don't do, and with "quick returns" as our signal cry, people can scarcely now afford to wait for him.

The dinner of the Society had only one drawback: it was laid in a room far too small for the occasion, and many were unable to find seats. Under such circumstances a company soon gets noisy and uncomfortable; and with the many more available buildings in the city this should not occur again. Nevertheless, the after-dinner talk was some of the best we have heard this season. It was business-like and practical, and promises even of itself to do something towards improving the district. From a report further on, it will be found that amongst the topics touched on were the breeding of stock, the making of cider, the lodging of the labourer, and the enlargement of the sphere of the Society's action. Famous as we have always supposed Hereford to be in this way, it appears that the art of brewing good cider has been gradually more and more neglected. A glass worth drinking is quite "out of the common;" and certainly, what we tasted had all the sharpness, and none of the soundness, of the real rough cider. However, Mr. Allen and the Essayists are going to amend this. But they must set about it at once, for Mr. Wren Hoskyns is specially retained to bring the Royal Agricultural Society of England to Hereford in the course of another year or two; and if we do not get plenty of good sound cider by then, the character of the county will be gone for ever.

PRIZE LIST.

HEREFORD CATTLE.

JUDGES.—E. Longmore, Adforton, Ludlow.
H. Higgins, Woolston Grange, Lydney.

BULL, COW, AND THEIR OFFSPRING; the offspring to be bred by the exhibitor.

First prize of £25, to Lord Berwick, Cronkhill, Shrewsbury (bull Severn, cow Beauty, calf Sabrina).

Second of £10, to Thomas Morris, Therrrow, Lyswan, Hay (bull Druid, cow Miss Noble, calf Riseman).

Third of £5, to Lord Bateman, Shobdon Court (bull Carlisle, cow Lady, calf Warwick).

The class commended.

BULLS calved on or after the 1st of July, 1858.

First prize of £20, to Edward Price, Court House, Pembridge (Sir John).

Second of £10, to William Perry, Cholstrey, Leominster (Goldfinder the Second).

Third of £5, to the Rev. Archer Clive, Whitfield (Cefnesco).

The class highly commended.

BULLS calved on or after the 1st of July, 1857.

First prize of 5 guineas, to William Perry, Cholstrey (Salisbury).

Second of £3, to Thos. Edwards, Wintercott (Leominster).
Commended.—C. Vevers, Ivington (Stratagem); and W. Taylor, Showle Court (Fancy Boy).

BULLS calved previous to the 1st of July, 1857.

First prize of 5 guineas, to John Williams, Kingaland (Sir Colia).

Second of £3, to Richard Hill, Golding, Salop (Claret).

Commended.—E. M. Power, Hill Court (Uncle Tom).

To the tenant-farmer who exhibits the best lot of beasts, bred by himself, and fed without corn or cake, under two years and six months old, in proportion to the quantity of land he occupies.

The tenant of 100 acres, two beasts.

" 200 acres, four beasts.

" 300 acres, six beasts.

The prize of 5 guineas to George Pitt, Chadnor Court, Dilwyn (over 300 acres); 6 heifers.

PAIRS OF HEIFERS, calved on or after the 1st of July, 1858.

First prize of 5 guineas, to Lord Bateman.

Second of £3, to Edward Price, Pembridge.

The class commended.

PAIRS OF HEIFERS, calved on or after the 1st of July, 1857.

First prize of 5 guineas, to Edward Price, Pembridge.

Second of 3 guineas, to the Rev. Archer Clive.

The class highly commended.

PAIRS OF STEERS, calved on or after the 1st of July, 1858.

First prize of 5 guineas, and second of £3, both to George Pitt, Chadnor Court.

PAIRS OF STEERS, calved on or after the 1st of July, 1857.

First prize of 5 guineas, to Lord Bateman.

Second of £3, to George Yeld, Teyford.

PAIRS OF STEERS, calved on or after the 1st of July, 1856.

First prize of 5 guineas to Lord Bateman.

BEST FOUR STEERS, calved on or after the 1st of July, 1856,

bred by one person, and to be the property of the exhibitor at the Hereford May fair, 1859.

The prize of 5 guineas to J. H. Arkwright, Hampton Court.

BEST LOT OF BREEDING COWS OR HEIFERS, not under three years old, that have had a calf within six months, or shall be in calf at the time of showing.

The occupier, if not exceeding 100 acres, to show two beasts.

" " " 150 acres, three beasts.

" " " 200 acres, four beasts.

And in the same proportion for every additional 50 acres.

First prize of £20, to Thomas Rea, Westonbony (295 acres); six cows.

Second of £5, to Edward Price, Pembridge (205 acres); five cows.

The class highly commended.

FAT COWS, of any age.

The prize of 5 guineas, to Lady Emily Foley, Stoke, Edith (Young Natty).

Highly commended.—T. Roberts, Ivington, Bury.

MILCH COWS, of pure Hereford breed.

The prize of 5 guineas, to Edward Price, Pembridge (Lovely).

SHEEP.

JUDGES.—G. Bright, Broom, Aston-on-Clun.

J. Price, Penalt, Ross.

(And for horses and pigs.)

PENS OF TWENTY SHROPSHIRE DOWN, or SHORT-WOOLLED BREEDING EWES, under three years and eight months.

The prize of 5 guineas to J. B. Downing, Holm Lacy.

Highly commended.—T. Roberts.

PENS OF TWENTY LONG-WOOLLED BREEDING EWES, under three years and eight months.

The prize of 5 guineas to Jonathan Davies, Webton Court.

PENS OF FOUR YEARLING WETHERS, long-wool.

The prize of £3 to Jonathan Davies, Webton Court.

Highly commended.—C. Kearsey, Glewstone.

PENS OF FOUR YEARLING EWES, long-wool.

The Prize of £3, to Jonathan Davies, Webton Court.

PENS OF FOUR YEARLING WETHERS, short-wool, cross-breeds not excluded.

The prize of £3, to Thomas Roberts, Ivington, Bury.

Commended.—J. E. Tomlinson, Whitlock.

PENS OF FOUR YEARLING EWES, short-wool, cross-breeds not excluded.

The prize of £3, to Thomas Roberts, Ivington, Bury.

Commended.—J. B. Downing; and R. Biddalgh, Ledbury.

PIGS.

BOARS, under two years of age.

The prize of £3, to Sir Velters Cornwall, Bart., Moccas.

Commended.—C. Kearsey.

BREEDING SOWS.

The prize of £2, to Sir Velters Cornwall, Bart.

Highly commended.—Lady Emily Foley.

Commended.—R. Cox, Ludlow.

HORSES.

CART STALLIONS.

The prize of 5 guineas, to F. Blakeley, Penrhos Court, Kingston (Barton).

Highly commended.—J. Theyer, Walford, Ross (Young Havelock).

CART MARE AND FOAL AT FOOT.

The prize of 5 guineas, to Benjamin Parry, Bradwardine (Darby).

THREE-YEARS-OLD COLTS, GELDINGS, OR FILLIES, for hunting purposes.

The prize of £5, to Thomas Smith, Lodge Farm.

NAG MARE WITH FOAL AT FOOT.

The prize of 5 guineas, to George Pye, Cublington, Madley (Brown Bear).

Highly commended.—J. H. Arkwright (Polly).

EXTRA STOCK AWARDS.

Edward Price, Pembridge, for bull (Goldfinder the Second).

Edward Price, Pembridge, for seven Breeding Cows.

Rev. A. Clive, Whitfield, for two-year-old Steer.

Jonathan Davies, Webton Court, for Ewe.

John Wigmore, Weston-under-Penyard, for ten cross-bred Ewes.

Richard Cox, Ludlow, for two breeding Sows.

Charles Bulmer, Holmer, for riding Gelding (Folly).

W. M. Vevers, Bartestree; for thorough-bred Stallion (Lochinvar).

WHEAT.

The best samples of WHITE WHEAT, grown by a tenant-farmer, in the county of Hereford.

The prize of 2½ guineas, to J. Wigmore, Weston-under-Penyard.

The best sample of RED WHEAT.

The prize of 2½ guineas, to J. Wigmore.

CYDER.

HEREFORDSHIRE CYDER, made from apples of the year 1858.

The prize of £5, to William Hill, Eggleton Court, Ledbury

THE BEST ESSAY ON THE MAKING AND MANAGEMENT OF CYDER.

The prize of 5 guineas to Clement Cadle, Ballingham Hall

IMPLEMENTS.

The best and largest collection of IMPROVED AGRICULTURAL MACHINERY AND IMPLEMENTS.

First prize of 5 guineas to Felix Smith, Upton Bishop, Ross.

Second of £2, to S. A. & H. Kell, Ross and Gloucester.

Commended.—J. L. Stephens, Hereford.

Special prize of £1, to Isaac James, Tivoli, Cheltenham; for Water Cart, Pump, two Washing Machines.

THE DINNER

Took place at the City Arms, Mr. Charles Wms. Allen, of the Moor, Kington, as President of the Society, in the chair, supported by the High Sheriff, Richard Yapp, Esq., of Cradley; Lord Llanover; Mr. J. King King, M.P.; Lord Wm. Graham, M.P.; Mr. Humphrey Mildmay, M.P.; Col. Clifford, M.P.; Mr. George Clive, M.P.; Rev. Archer Clive, M.P.; Mr. R. Biddulph; Mr. Chandos Wren Hoskyns; Mr. T. Duckham; Mr. Price (Pembroke); Mr. Perry (Cholatre); Mr. Hill (Golding); the Judges, the Stewards, and the principal agriculturists of the county.

After the customary loyal toasts,

The CHAIRMAN gave—"The County Members."

In responding, Mr. KING KING referred to the great deficiency of hands on the farm, and the consequent high wages which were demanded during the late harvest in this country. There could be no question that there was a deficiency of hands in this country. In many places, the regular cultivation of the farm had suffered by the scarcity of those hands which the farmer would wish to engage. There was a discussion at Leominster the other evening, rather too late in the evening to allow of an answer; but from that discussion it appeared that there could be no doubt, in certain parts of the county, there was a great deficiency of good cottage accommodation. And the excellent Chairman at Leominster said that, in his opinion, a certain number of cottages per 100 acres were necessary. He had so often heard this question discussed, that he had recently turned his attention to it. The worthy and practical Chairman at Leominster said that, in his opinion, at least three cottages were necessary to every 100 acres; but he (Mr. King) believed that, if there were about two to that extent of land, the labourers would get on very well, and be much better off than at present. He would take it for granted that the labourers would not all have families; and some of those cottages would possess accommodation for labourers and lodgers; and in many of the rambling old farm-houses there was room for some of the labourers to reside. Let them, instead of talking so much about it, unite their efforts in improving cottage accommodation. It was a subject of arrangement between landlord and tenant; but he thought, if there was the number of cottages per 100 acres he had mentioned, things would go tolerably well.

Lord WILLIAM GRAHAM had to congratulate them on the manner in which the harvest had been gathered in this year, though he must corroborate the statement of his hon. colleague, that there was in many places a scarcity of labourers and a want of hands; and, so far as he could form an opinion, he did not see that that scarcity of labourers was likely to diminish, as the demand for labourers for the purposes of manufacture, trade, and commerce, and the requirements for the army, navy, and militia, he thought, were likely to absorb all the surplus population for some time to come. The farmers must turn their attention more and more to the use of machinery; and they must take good care their labourers were well fed, well paid, and well housed. A good deal had been done in that direction, but a great deal yet remained to be done; and it should be remembered that a good

labourer, who was well paid and well fed, did more labour than an unskilled labourer who was ill-fed and ill-paid.

Mr. H. MILDMAI, the third County Member, however much he might rejoice in the prosperity of the county, could not but regret that the improvement in agriculture did away with some of the hedgerow timber and the beautiful broad hedges which now formed one great feature of Herefordshire: he supposed that modern improvement must go on, notwithstanding. However, as long as the apple orchards, the oaks, and the rich pastures remained, Herefordshire could never be otherwise than beautiful beyond all other counties. The increased use of machinery in the agricultural districts was one feasible way of supplying the defect arising from the scarcity of labour; and this must be beneficial alike to the farmer and to the agricultural labourer, for, if delicate machinery was to be used, they must raise up an intelligent class of labourers to superintend it, as, however active and industrious a master might be, he could not be everywhere at once, and must therefore be supported by active and intelligent servants; but they would never be got to a high condition unless they were well paid. The first and most important consideration was, to improve the labourers' cottages, as that would not only be beneficial to the latter, but also advantageous to the landlord. The increased habit of comfort would produce more respectability in the labourer, and would lead him to habits of saving which would prevent his becoming chargeable upon the rates on every sudden emergency. He objected to the evil tendency of the hirings at fairs, and submitted that, as these fairs had been dispensed with in other parts of England, it was quite possible to do without them in Hereford. The third means of improving the condition of the labourer was by educating the children. The more intelligent a man was, the more valuable his labour was; and in proportion to the progress of education would the character of the labourer be raised. The clergy, gentry, and farmers might do much to promote the education of the labourer—indeed, he believed that no system of education could be effectually carried out for the agricultural labourer, unless the farmer used his influence with those in his employment to send their children to school. However, there was certain work on the farm that must be done by children—for instance, the farmer could not afford to employ grown men for bird-keeping; but what he (Mr. Mildmay) suggested was, that some boys should not be kept constantly at work, but that they should be relieved by others on some days of the week, so that all might have an opportunity of attending school.

The PRESIDENT next proposed the health of the "Members for the City of Hereford." He was sorry that Colonel Clifford, the senior member, had left the room, for he should like to have told him that he (the president) served many years under him when the hon. member was chairman of the Quarter Sessions, and had the pleasure of frequently approving of his mild ruling. The president congratulated Mr. Clive on the position he occupied as representative of that city, and observed that, connected with the two great leading political parties in the country, there was a very remarkable circumstance, and one of which Herefordshire ought to be proud; no matter whichever party was in power, it appeared that it could not make up an Administration without a Herefordshire member (cheers). Were the Conservatives in power, the talented member for Leominster was sent for; were the present respected Ministers in power, they could not get an Under-Secretary of State without sending to Hereford for him (laughter and cheers). It was usual for a president at that Society's dinner to announce who his successor was for the coming year, and he was very happy to tell them that Mr.

George Clive had kindly consented to take that office for the next year (cheers).

Mr. GEO. CLIVE, M.P., in answer for the city members, referring to his acceptance of the office of president of the Society for the ensuing year, said he hoped at any rate they would all then attend, if it was only to see how badly the duty was done. He could not help reverting to the last time he dined in that room, which was some twenty-five years ago. Very few of the faces now around him were in the room then. Comparing the state of agriculture in this county generally, though much was owing to the progress of intellect, education, and civilisation generally, he could not help thinking that much of the improvement had been brought about by the operation of this Society. There was no profession which so much needed stimulus and competition as that of agriculture. In other professions, competition works out good results. If a merchant sells bad goods, he is not employed any longer; if a lawyer ruins his client, or hangs him, he loses his connection. If a clergyman—and he wished to speak with due reverence of the body—preaches uncommonly dull sermons, his attendance gradually diminishes. But up to the time when these societies were instituted, there was no mode in which the agriculturists could compare their mutual produce; and men might live on small farms in remote districts, and breed such animals as they saw twenty-five years ago, with high rumps, narrow hips, straight shoulders, and big heads ("No, no.") A man might get his daily bread by farming in that way, but make little or no progress; and there was no means by which he could institute comparison between his own state and that of others until these societies were established. They might not extend very rapidly to the remoter parts of a district, but they could not have other than a healthy result to the community at large.

The PRESIDENT returned thanks for the honour they had done himself, and should like to refer to one or two of the prizes that had been offered. He told the committee, when he was appointed president, that he should give the prize which had that day been competed for, for the best essay on the production and making of cider. There was another prize he was extremely anxious should be made a subject of competition, but it would take three years to try it, and at his request the committee had kindly pledged themselves to continue the premium for two years more, in order to test the value of that prize. He alluded to the prize which had been offered for the best milch cow. A similar prize, which had been offered by his late valued friend, Mr. Penoyre, had been a total failure, for his prize for a cow in calf or milk had very soon resolved itself into a prize for the best fat cow. The terms of his (Mr. Allen's) prize were for the best milch cow of the pure Hereford breed; and he hoped that the question would be discussed. He considered that it was of the greatest importance that we should improve the milking qualities of the Hereford cow. The Earl of Oxford once declared that he would engage to make a Hereford cow yield as well as a shorthorn. There could be no doubt the milking qualities of the Hereford cow might be very much improved; by what means must be decided by time and trial. He was sorry to see the small number of competitors, and he hoped after this little explanation there would be more competitors. The other prize to which he desired to allude was for the best essay on the management and making of cider. His friend, Mr. F. Thomas, liberally and kindly gave a prize for the best hoghead of cider, and he (Mr. Allen) prophesied that which had turned out exactly true, that there would be very few competitors. The knowledge and practice of making first-rate cider in that

county was in rather few hands, and in consequence of that fact it turned out as he anticipated, that there were very few competitors for that prize. He liked a glass of cider; and he hoped that if next year any gentleman should liberally give a prize for the best hoghead of cider, that there would be more competitors—he should like to be one—and that they would study a little more the doctrine of cider-making. To his great surprise, the committee asked him to decide his own prize; but he thought that was one of those things which would be done very much better by others. He represented that there might be some suspicion attaching to the award, but the committee would not hear of it. But he determined that, whether he acted in conjunction with the committee or with other gentlemen, his own judgment should not decide the award. Two of the essays he read over six or eight times, and made analyses of several of them. He called in several gentlemen to assist him. Two or three of the essays were very near in point of quality, but the balance of opinion was decidedly in favour of the essay to which the prize was awarded. The copyright belonged, of course, to him who wrote it, but he hoped arrangements would be made for its publication. He discouraged the use of scientific terms, because plain language conveyed all the information they desired; but it might not be advisable to exclude it altogether, as no one would deny that the doctrine of cider-making depended on chemical considerations. There were eight competitors, and four of the essays were very good. He should, therefore, be very glad if the writers of the unsuccessful essays would allow portions of them to be used for the purposes of publication; and he would himself, or he would endeavour to prevail upon the committee, to construct some formula of useful hints, which would come before the county in addition to the essay which had won the prize. He had had a glass of the prize cider. It was really a splendid specimen, and made him regret that a beverage of such a quality should not be found more generally in the county.

Mr. R. BIDDULPH said: Touching the cider question, he believed that, from some cause or other, for some years past the cider of this country had not attained that perfection it used to do. They made the same quantity—indeed he believed they made a larger quantity than in years past; still they did not succeed. He therefore thought they were much indebted to Mr. Allen for having offered so large and handsome a prize for an essay, and he (Mr. Biddulph) felt sure that, when it was published in a cheap form, that it would be of great benefit to cider-makers. Although he was one of those who inveighed against the abuse of drink, he was very fond of a glass of good cider; and he moreover believed that, when the county of Hereford should become intersected by railways, they would find very great demand for it, and that it would become a great source of revenue. There is even now a very large quantity of cider sent out of the county, which realised a vast deal of money. It seemed to him a very singular circumstance, that at dinner, when he, with Mr. Clive, asked for some cider, and they had it brought to them, it was not such as they could drink. They then asked for bottled cider, but there was no such thing to be had. Was it not singular that in a large inn, in the metropolis of the county so celebrated for its cider, when it was asked for it was not to be had? The county was much indebted to Mr. Thomas and Mr. Allen for the prizes they had offered, which no doubt would have a result very beneficial to its inhabitants. If such a prize should be offered again, he would suggest that it should be at the option of the committee to purchase the cider, so that they might all have the pleasure of tasting it. He congratulated

the county upon the show of that day, which was undoubtedly the best show of Hereford cattle ever seen. A very few years ago the quantity of stock exhibited was small, and he attributed the excellence of that day's show to the result of the exertions of the committee and gentlemen associated with them. It was his (Mr. Biddulph's) good fortune on the previous day to be with the gentleman who inspected Lady Emily Foley's estates for the prizes which her ladyship offers for the best cultivated farms on the Stoke Edith property. He was not going to make any remarks upon it, but he must say that he never saw a better cultivated estate in his life; and he therefore congratulated both her ladyship and her tenantry upon the very superior display of agricultural knowledge evinced by the admirable way in which the estate was cultivated. Mr. Biddulph concluded by giving the health of the Rev. Archer Clive, and The Committee.

The Rev. W. P. HORTON remarked that he had received a commission from an Australian merchant to purchase some "Herefordshire cider," with the view of testing whether it would bear the carriage to that country. Intending to execute that commission, he had some time since, in his own mind, fixed upon the person who had obtained the prize (Mr. Wm. Hill, of Lower Egleton Court, near Ledbury) to supply him with it, knowing him to be one of the most experienced manufacturers. If that cider should bear the voyage, he had no doubt that Australia will become a large purchaser of the county beverage.

The Rev. A. CLIVE said: No doubt the offering of the prize would greatly conduce to improvement in the making of cider. Every district could not make first-class cider, but they could all make it better than they did at present. He had tasted some with a tenant of his who lived in a little out-of-the-way place, which he said he obtained 6d. or 8d. per gallon for amongst the iron-works, but which he (Mr. Clive) should not like to be compelled to drink, and for which a much larger price would be obtained if it were well made.

Mr. CHANDOS WERN HOSKYNs said the toast of "The Successful Competitors" was submitted to him. This was rather unfortunate, as he had not the good fortune to arrive at the show early enough to take such a view of the beasts, and make such an examination of them as would enable him to say one word in detail upon their individual qualities; but the impression made upon his mind by the very cursory glance he was in a position to take was perfectly astounding. For many years past he had had the opportunity of looking at the Herefords exhibited at the Royal Agricultural Society's Shows, and, as one of the stewards, had passed through those shows of stock merely as an amateur, paying particular attention, however, to that department allotted to Hereford cattle. At such places as Carlisle and Chelmsford, it could not be expected that the show of Herefords could be very numerous; yet as a class they had held their own well. They were always of the first quality; and in the presence of the popular breeds of this county, whether the beautiful little Devon, or the splendid specimens of shorthorns, he had never but felt proud of his native county. But he had been absolutely surprised beyond anything he could have expected by the show he had the gratification of glancing at before he came to that room. He regretted that he was unable to look at the animals individually, and only able to run through the exhibition; but the number shown together had such an effect upon the eye, after seeing the stock shown at the Royal Agricultural Society's meetings, as was peculiarly astonishing, and could not but take him back respectively to the smaller exhibitions he had seen of Hereford stock at the Royal Society's meetings. It not only, however, took his

mind back to days gone by, but it also took his mind forward to the day—which he hoped was not far distant—when the Royal Agricultural Society of England would be able—for it was purely a question of ability—to hold their show at Hereford. He had had the immense satisfaction of being instrumental in getting the society to pay a visit in the locality of his residence in Warwickshire; but to do this he had to make the proposition that it should do so, and was fortunate in getting a seconder, to the council of the society four years before the event occurred. The next visit that he was anxious that the society should make as early as possible was to Hereford. To this end it was necessary for the county of Hereford to show that they are sensible of the great requirements for such a gathering as that of the great Royal Agricultural Society. Indeed they could not too soon take into their consideration what were the absolute and necessary preliminary steps required to be taken before they could hope to have that consummation of their wishes. In the first place, there must be plenty of railroads to the city, and where there was only a single line it would be difficult to tell the annoyance and disappointment that would probably result at such a time and from such a circumstance. They must show the Royal Society that they had the facilities to enable persons to have anything like a satisfactory opportunity of seeing things. Therefore he hoped to see the Worcester and Hereford railway soon brought to a completion. Local prizes must make an important feature in the list of premiums. All that he had heard that day about cider was most important, because at the Warwick meeting the show of cheese was completely spoiled by the inattention to a matter of such local importance. Like men spoken of in days of yore, they had heard of its coming, but did not know what it would be. Consequently, very few exhibited. In the county of Hereford they might get up a good local exhibition of hops, cider, and other commodities grown on the soil. A great desideratum in local exhibitions was well-written essays upon agricultural subjects. As one of the editors of the Society's Journal, he was in a position to say that the great drawback amongst writers on agricultural subjects was the power of expression; they possessed a large amount of knowledge and of intelligence, but they lacked the power of expressing their ideas in suitable language. He hoped that after the Canterbury meeting, which would take place next year, they should not be long before they had the show of the Royal Agricultural Society at Hereford. In the following year they intended to have a very large meeting in London, and they expected a great many foreigners; it was a meeting for all England. He did not see why the Royal Agricultural show should not be held at Hereford in 1862.

Mr. DUCKHAM, in acknowledging the compliment they paid him as the director of the showyard, said they had had a most successful meeting. Although the disease had kept many valuable animals from the exhibition, still they had such a collection as astonished the stranger. He commenced his duties with the "Herd Book." He felt that the thorough establishment of the Hereford Society was one of the greatest benefits that could be conferred on the county, as it would forward the interest of the Hereford breed beyond anything else—second only to the "Herd Book." The latter he believed was all important to the breeders, and he flattered himself that they were beginning to see that it was so. Perhaps he might be allowed to touch on the subject relative to the early meeting of the Royal Agricultural Society in this county. He had some correspondence respecting it many months ago with the

late respected secretary, and it was with pleasure that he (Mr. Duckham) listened to the remarks of Mr. Hoakyns, upon the subject. They also had some conversation upon it sometime ago, and he was glad to hear from Mr. Hoakyns that it was probable the meeting of that society would be held in this county in 1862, when he (Mr. Duckham) hoped that the Worcester and Hereford Railway would be completed, as well as perhaps the Hereford and Brecon. At all events, whether they were so or not, he felt thoroughly convinced that Hereford was better situated for the purpose of the Society's exhibition than the town of Warwick was. Last year he was an exhibitor and an attendant at the exhibition at Warwick, and he could not speak in high terms of the accommodation that was afforded there. Whether in travelling, or other accommodation, Hereford was as well as Warwick; therefore Hereford had a right to look to the Royal Agricultural Society to come to it at an early period (cheers). Hereford supplied the Society's exhibition with one of the most attractive classes, and he thought from that fact that the county had great claims on the Society's attention.

Mr. H. HIGGINS, as one of the judges of the day, assured them he could only repeat what other gentlemen had said, that in his experience of the show-yard he had never before seen so many good animals together, neither did he think that so many animals of such uniform character in quality and goodness had been before exhibited in the yard as they had seen on that occasion. All honour and praise to the efficient farmers and the gentlemen of the county, who had not been carried away by the clamour of the popular breed, but had steadily persevered with the Herefords. It must have been gratifying to those who attended the sale that day to see the Australian gentleman give 120 guineas for the yearling bull which took the first prize, and 325 guineas was given for a two-year-old bull. That, he thought, showed something like steady progress for the Herefords through the world. He hoped and trusted that what had fallen from Mr. Wren Hoakyns, who had great influence in the council of the Royal Agricultural Society, would be carried out. He was satisfied that any suggestion made by Mr. Hoakyns to that society would have great weight; and if the Rev. Mr. Olive and other gentlemen would push the matter forward, he thought

that Hereford would soon be considered worthy of having the agricultural show. The Royal Agricultural show being brought down here in the course of a very few years—and Hereford was fully entitled to have the show when the breed of her beasts was considered—it would then be made manifest to the world what the native breed of Hereford really was. It had never yet been seen at the Royal Agricultural Society's Shows, inasmuch as the cattle were principally in the tenant-farmers' hands, and they could not afford to send their cattle across the country to compete. They had not received the proper remuneration for their cattle during the popularity of the shorthorns; but he believed that when they were properly tested—when the foreigner was brought to that central position to inspect them—they would stand much higher than they had ever done before. He would offer one suggestion which he hoped would be carried into effect—that the other societies in that county would take into their consideration the propriety of amalgamating their societies with this one, and so making one great county society. He was satisfied that that would be for the advantage of all. He remembered that three years ago he was asked by a citizen of Hereford what could be done for the Agricultural Society of Hereford, to bring it up from the low position in which it then was? He replied by advising that a great leading premium should be given, as he had no doubt that that would effect the desired object. That gentleman replied that he had not the slightest doubt that, if it could be shown to the citizens of Hereford that the plan recommended would restore the society to its former state, they would subscribe the necessary amount; that gentleman, with the assistance of the city, rose £100, and he (Mr. Higgins) asked them what effect that subscription had had on the society during the last two years? Had it not steadily progressed since the premium to which he had alluded had been awarded? Therefore he submitted that if the branch societies—he would not call them little societies—would amalgamate themselves with the Hereford Society, it would be for the interest of all parties, for the interest of the county of Hereford, and for the interest of the breed generally.

There were a number of other toasts, the concluding one being "Success to the Herefordshire Agricultural Society."

EDUCATE YOUR FARM LABOURERS.

At the Ludlow Agricultural Society, in proposing "Prosperity and Comfort to the Labourers," the speaker said:—"This is a toast that the individual experience of almost every one of you will prove to yourselves to be one with which the welfare of agriculture is intimately bound up. Because, if you look to the extent of trust which every farmer, in every department of his farming, must place in those agricultural servants, you will agree how desirable it is that they should be men fitted for their duty. When the farmer absents himself in attending market, or elsewhere, they are to be entrusted with the care of the granary—with the care of animals—those high-priced delicate creatures which we have seen to-day, and which we know require as much tending almost as his children themselves; and when you consider these things, I think you must discover the advantage which must arise to those of the farmers who have in their service men whom they can trust, men in whom they can confide, and not men whom they cannot trust out of their sight for a moment. Gentlemen, it is an agreeable thing to think that the progress of agriculture,

which has been so great of late years, has been conducive to their comfort. When we look at the vast scientific improvements which have taken place of late in the operations of agriculture, we shall find that they have tended to improve the condition of the farm labourers. It is now seen that it is to the advantage of landlord and tenant to have about them a better class of men. We look at the machinery which is bringing agriculture more and more to perfection, and which is indispensable on the farm, and conclude that greater intelligence is required to work them. It was said that they would cause a gradual diminution of labour; but, I think the result has been to the contrary, for there seems a scarcity of labourers to work those machines. We see that it is not likely the steam engines, the steam plough, and the complicated mills which are now seen on many farmers' homesteads, will work themselves. They must have some one to look after them with more than the knowledge of a ploughman. Some twenty years ago you may recollect with what anger the first thrashing machine was met in the midland counties, on the principle that

it would damage the interests and bring down the wages of the labourers. But what has been the result? The result has been that the success of agriculture has increased—and with it the making of machines has increased—and farmers have been able to employ men to a much larger extent, and to give them better remuneration. In 1830 you were angry when you passed a thrashing machine; now how many of you are there who can get a labourer to threaten to any great extent for you! There are other signs also of the gradual improvement which is going on among the labouring classes, as exhibited in their improved education, and improvements in their cottages, though there are few who are able to practise the latter to such a magnitude and with such skill as the Duke of Bedford. All these things show that the agricultural labourer is participating in the general prosperity of the country. I am sure all those who contribute in the various departments of agriculture have one common interest, and are bound together by one common effort for the prosperity of their calling."

At the Henstead Association, SIR JOHN BOILEAU (addressing the labourers) said:—"It has been my custom on preceding occasions to make some remarks upon any circumstances occurring in the world around us that may bear upon your interests. There are only two matters that it occurs to me I need mention at the present time. The first of them is, that there is a very great improvement, greater than ever before, going on in machinery. Most of you have heard of the reaping and mowing machines now being introduced into this country. Well, my friends, these machines can do their work cheaper and better than any man can do it, and it is absolutely necessary that when they go on improving and becoming really applicable, that the farmer must employ them. But don't be alarmed at that. It will be rather a twofold advantage to you. It is true that for a little time you may not have the usual work; but if the farmer gains money, and saves money, by using these machines, he will not go and button that money up in his pocket any more than he now buttons up his capital, but will lay it out on other work which will employ you, and that work will, in all human probability, be much lighter and easier work than now; because threshing, reaping, and mowing are laborious; but if they can be done by machinery, men will be employed to watch and guide the machinery, and other necessary work. You will be better paid, and if by means of the machinery the farmers can produce corn at a less rate, your food will be cheaper, and you will altogether be in a better state than at present. I can hardly hope in these few words to convey to you all a very clear notion of why I think you should not be afraid of machinery, and why I think it will do you good; but I wish to persuade you that, as I am a friend to the poor man, and desire his welfare, I would not tell you that these things will be for your benefit if they were not so. I will add in conclusion on this point, that the next generation must be better educated than the present. There will be required more skill, intelligence, and knowledge, on the part of the labouring classes, and, as in the next generation the man best informed will be the man who will get the best pay, I would earnestly urge upon all of you to keep your children as long as possible at school, because that is the way in which they will obtain that intelligence which will enable them, when you are gone, and when that change takes place that must soon come, to get their livelihood, and succeed where those less skilled will fail."

The same text was taken by the Chairman of the Roding Labourers' Friend Society (J. W. PERRY WATLINGTON, M.P.), who said:—"Another great object of this society was the encouragement of skill in the agricultural classes, and to make

the labourers more ready and correct in the different departments of their calling; and he was sure that at a time when agriculture was so much improved, when the number of implements was so much increased, and a new agent—steam—was being introduced into the cultivation of the soil, it was of the utmost importance to the farmer and the labourer—it was important to agriculture itself—that the improvement of the operator should be extended in the same proportion. He believed that there were not now two opinions as to the advantage of educating the labourer.

DEEP DRAINING.—At the Surrey Agricultural Society's Meeting, Mr. Butcher, in responding on behalf of the successful candidates, said, he felt proud of the prize he had received, not so much on account of its intrinsic value as for the distinction it conferred. Entering upon an explanation of his plan of drainage, he avowed himself to be a deep drainer, and to have been so for the last 30 years. He remembered to have been laughed at for placing a main drain 18 feet deep. In the place where he had carried on his operations the surface drainage had been attempted by one after another most unsuccessfully, but the reeds still remained just the same, and could not be cured. He, however, having plenty of energy, and the owner placing at his disposal plenty of money, he had succeeded in restoring an estate which had been represented as irreclaimable. He felt pleased that he had succeeded, because the old men of the day gone by were unable to find out the secret. He found it out thus, that while others were content with mere surface drains, he dug deeper and deeper until he came down to the springs. He made a deep main drain, while his general drainage was about four feet; though on coming into the farm he found his neighbours' drainage about two feet. He felt that the land he had drained was drained efficiently. He advised that land should not be drained in small portions, and with furrows; but even in a clay soil, to allow the moisture to pass quickly through, as if through a colander, without leaving any of it to adhere to the surface. If the water was required to be carried off the surface, it must be done by ploughing on a flat surface; and whatever draining was done on stiff land was required to be done deep. He was proud to have beaten his friend Mr. Whitburn; and if he could improve further in draining, the company might depend upon it he would do so. On meadow land it was necessary to be careful, and to drain on a proper system, with the drains not too closely connected; always keeping one consideration in mind—not to study an artificial position, but to take nature's surface; and as nature makes the fall of the land, let the workmen take the out.

HOW TO TEST THE QUALITY OF WOOL.—A Texas paper says:—"Take a lock of wool from the sheep's back, and place it upon an inch rule. If you can count from thirty to thirty-three of the spirals or folds in the space of an inch, it equals in quality the finest electoral of Saxony wool grown. Of course when the number of spirals to the inch diminishes, the quality of the wool becomes relatively inferior. Many tests have been tried, but this is considered the simplest and best. Cotswold wool and some other inferior wools do not measure nine spirals to the inch. With this test, every farmer has in possession a knowledge which will enable him to form a correct judgment of the quality of all kinds of wool. There are some coarse wools which experienced wool growers do not rank as wool, but as hair, on account of the hardness and straightness of the fibres.

THE SEWAGE QUESTION.—THE RELATION OF TOWN AND COUNTRY.

COAL AND CORN.

The smoke nuisance of our large cities, especially those of our manufacturing districts, has always been a fruitful theme for our sanitary reformers to descant upon. Vivid pictures have been drawn of the unhappy fate of those who in "city pent," far from the "wave of woods and corn-fields," perpetually dwell "mid the turbid air and chaos of eternal smoke," antagonistic alike to lung and brain, of the purity of the one and the health of the other: melancholy moanings have been made over stunted trees and languishing vegetation, and what honest John Evelyn quaintly and tersely termed "the hellish and dismal cloud of sea-coal," which obscures the glorious sunlight, and rarely allows—to gladden the eyes of weary workers—a sight of heaven's own ethereal blue. Nor has the economic—the merely pounds-shillings-and-pence—view of the case been forgotten. Suggestive, if not somewhat vague and uncertain, estimates have been made of the loss sustained by manufacturers, who, with a strange indifference to waste, not usually characteristic of their race, belch forth from the thousand-and-one apertures of gigantic chimneys tons of coal which should be consumed in the interior of their furnaces; nor have calculations been wanting—going home, perhaps, more forcibly to the bosoms of all concerned than any other—to show the loss of linen, its extra wear-and-tear, and the increase of washing-bills, occasioned solely by the existence of the smoke nuisance. All this agitation, carried on for a long series of years, has resulted in attracting a large proportion of public interest to the question, and finally in legislative and municipal interference—an interference which, compelling smoke-producers to consume it, as the phrase goes, bids fair, some day or other, to restore to our skies as much of the clearness of atmosphere as our climate can afford; and to let clouds, if clouds there are to be, be of nature's, not man's, making. But at this transition period of the question, some thinking men amongst us have boldly disputed whether the getting rid of the apparent or visible evil, the smoke cloud, is all that is to be done; and have not hesitated to declare their belief that the *invisible* evil—ignored by all smoke denouncers—is just *the* evil which is most to be dreaded, and the existence of which is chiefly owing to this same smoke consumption, which is declared by the majority of sanitary reformers as the "be-all and end-all" of the question.

Of this class of thinkers, a very clear exponent of the principle upon which they found their opinions is the author of the pamphlet now before us.* As to the general

* "Coal, Smoke, and Sewage, Scientifically and Practically Considered; with Suggestions for the Sanitary Improvements of the Drainage of Towns and the Beneficial Application of the Sewage." Being the substance of a paper read before the Literary and Philosophical Society of Manchester. By Peter Spence. Manchester: Cave and Seven, Hunt's Bank.

inattention to the invisible evil of the smoke question, the author has the following: "In our atmospheric condition, the visible evil is the apparent and palpable carbon, the black smoke of our fires and furnaces. This has—in our manufacturing towns especially, and also in the metropolis—become so crying an evil, that even a legal remedy has been resorted to; and the law demands, and in some instances obtains, an abatement of the noxious practice. But the invisible evil is completely ignored; the smoke nuisance is held as *the* evil of our atmospheric condition. "Burn your smoke!" is the united cry of the Sanitary Association, the public, and the law. The visible evil here has attracted all the attention of the learned and the unlearned; and hardly a solitary voice has yet been heard *against* the smoke-consumption crusade or the sanitary smoke-consuming mania, if I may be allowed the expression: for in this case, not only does the cure of the visible not effect the cure of the invisible evil, but every effort to effect the cure of the one only increases the noxiousness of the other. Perfect freedom from smoke would, if accomplished, only increase the evil arising from the purely gaseous results of combination." To prove this position, so boldly announced in the face of our presumed experience on the subject, and of the opinion of our highest scientific authorities, Mr. Spence goes elaborately into the theory and practice of combustion of coal in the fire-places of our houses and the furnaces of our manufactories. Space will only allow us to give an abstract of these investigations; for a fuller exposition of them, we refer the reader to the pamphlet itself.

In the two classes of smoke which make up the mass of smoke which darkens the skies over our great cities—namely, house and furnace—there are essential differences in character, as there is in appearance. House smoke is of a very "heterogeneous composition;" that of furnaces is of a much more simple character. To note the distinctive character of these two classes of smoke, it will be essential to trace the two distinct stages in the decomposition of coal by heat, in whatever way that heat is applied. The first, or distillatory process, which takes place alike in closed furnaces and open fire-places, is of the same character as that carried on in the retort of the gas manufacturer. This distillatory process not only eliminates the volatile constituents of the coal—as hydrogen, carbon, nitrogen, and sulphur—but form at the moment of their expulsion "chemical unions, giving rise to a most interesting series of compounds." The result of the distillatory stage of combustion in our closed furnaces is the dense black cloud which, issuing from the chimney, is too well known to city denizens; this contains an "immense volume" of nearly pure carbon, precipitated from the tarry vapours, and also partly from the carbonic oxide. Mixed with

this mass, and in an innoxious condition, we may find the sulphur, from the coal, as a distillate, through the affinity of the hydrogen gas, but again precipitated by the hydrogen, from its greater preference for oxygen. In opposition to generally received opinion, Mr. Spence "decidedly and considerably" hazards the assertion that "this period of the process of combustion in our manufacturing operations is the very point where the least mischief is done to the condition of the atmosphere and the health of our population. To sustain this, Mr. Spence gives a hypothetical analysis of the gases arising from the chimney during the distillatory process, as follows—

" 198lbs. of nitrogen gas,
39-6lbs. water or steam,
29lbs. carbonic oxide gas,
31-5lbs. carbon or soot,
2lbs. sulphuric, as soot or solid,
1lb. carbonate of ammonia, or sulphate of ammonia.

"Of these constituents of the smoke, only one is of a character positively deleterious to health. Nitrogen gas is purely negative, and is not altered by passing through the fire. The water needs no defence. The solid carbon, against which all the cry is raised, is guiltless of any deleterious effect on human health, is one of the most anti-putrescent bodies, and while floating in the atmosphere does all that it can to arrest and destroy noxious and miasmatic vapour. Sulphur, again, in its solid form, is perfectly innoxious. The only objectionable body is the carbonic oxide gas; this is certainly poisonous, being equal in that respect to carbonic acid gas. It has, however, this advantage—that while carbonic acid gas has a specific gravity of 1.52, air being 1.0, and is thus 50 per cent. heavier than common air, the specific gravity of carbonic oxide is only 0.96, or somewhat less than air. It is not only aided in its escape by the laws of diffusion, but its lightness always prevents it from any tendency to descend to the human dwellings around."

As a contrast to this state of matters, Mr. Spence gives an analysis of the compound proceeding from the chimney when the second stage of decomposition is gone; or, that is, when the residuary coke of the distillatory process is undergoing the process of perfect combustion.

" 568lbs. of nitrogen gas,
163lbs. of carbonic acid gas,
39-6lbs. of water,
5lbs. of sulphureous acid gas,
1lb. of sulphate of ammonia.

"Now," says Mr. Spence, "I put it to the sanitary smoke-consumer to make his choice. Will he consent to have from every 100lbs. of coal during the distillatory stage of combustion 29lbs. of poisonous carbonic oxide gas, * * * and at the same time bear with the black smoke, which confines its ravages to the destruction of the purity of his linen? or will he choose, instead, 163lbs. of heavy carbonic acid gas descending around him by its specific weight, despite the law of diffusion, and so poisonous in its character, that it is an

ascertained fact that 7 per cent. of it diffused in the atmosphere is immediately destructive of human life?"

The economical results obtained by carrying out combustion through both stages is influencing the question more than other considerations; so that with more widely extended smoke combustion, or, rather, perfect combustion of fuel, the evil here pointed out by Mr. Spence is likely to become daily more and more potent. As the immense volume of deleterious gases cannot be removed from the atmosphere, Mr. Spence proposes to carry them, by a system of "atmospheric or gaseous sewerage," entirely from the portion of the atmosphere in which we live, "into the vast atmospheric ocean over our heads at a point which would effectually preclude their returning upon us." Briefly this system may be described as the establishment of a complete series of underground tunnels or drains for the conveyance of our liquid sewage—the surface or rain water drainage being kept distinct from this—and through these tunnels the smoke and gaseous products from our fires and furnaces to be driven; the whole of the tunnels converging to a point where an immense chimney, at least 600 feet high, is to be erected—the ascensive power or draught of this chimney being such as, not only to drive effectually from the drain all noxious emanations, but to draw in (through every crevice or opening by which a communication to the outer air could be made) fresh air with a pressure or suction of 3½lbs. to the foot, or a velocity of 40 feet per second.

But the passing of the destructive gases of our coal combustion, and of the noxious emanations of our drains, to a region of the atmosphere beyond the zone of respiration, are not the only advantages derivable from the system. It has a direct and immediate connection with the subject of agriculture, in the progress of which we are all interested. The products of our coal combustion, the sulphureous acid gas, as it is dragged by the power of the huge central chimney along the drains or sewers, would come in contact with the liquid sewage, and, while arresting its putrefactive properties, would convert all the ammonia into sulphate, "thus entirely preventing its escape at any future stage of the process; so that, when converted into a dry manure, every atom of the combined nitrogen would be available as a fertilizer." Nor is this all. Ammonia, in one form or another, is an invariable result of coal combustion; so that the waste gases passing through the drains would "become themselves the direct source of a most valuable deposit, which has never yet been looked on as one of the elements of benefit to be derived from the excreta of our towns."

The result of investigation, undertaken at Mr. Spence's request, shows that for every ton of coal consumed 22.4lbs. of sulphate of ammonia is obtained. Two millions of tons of coal are consumed annually in Manchester and Salford, which gives the money value of the sulphate of ammonia produced from this amount (taking the average price at £15 per ton) as equal to £300,000. Combined with the sewage of these towns, an artificial guano, equal in amount to 162,500 tons, would be annually produced. Averaging this at £5 per ton, the

amount in money value would be £812,500; taking half of this as the expense of manufacture, £300,000 or £400,000 may be set down as the annual value of the sewage of Manchester and Salford obtained by Mr. Spence's system.

After drawing a glowing picture of the advantages derivable from the adoption of his system, Mr. Spence concludes as follows: "These are not extravagant anticipations, but legitimate deductions from the data exhib-

ited. The subject is one of great and pressing importance; and it claims the sympathy of the thoughtful, of the philanthropist, of every one, in fact, who values the life, the health, and comfort of himself and his fellow-man. As to its ultimate accomplishment, this I am convinced is only a matter of time; and my hope is that these remarks may lead to its being contemplated not as a chimera, but as a most desirable and practicable reality."

R. S. B.

THE SUPPLY OF WHEAT FROM AMERICA.

We have for some years been in the habit of taking it for granted that a large portion of our supply of foreign wheat and flour must come from the United States, where immense tracts of new land are being annually brought under cultivation. It is from thence we receive from time to time the most astounding reports of the unprecedented increase of production and of exporting power, the cheapness and excellence of the prairie land of the Western States, where no felling of forests nor clearing of jungle—retard the operation of the plough or prevent the immediate appropriation of the soil to the cultivation of cereal crops. These numerous advantages, too, are said to counterbalance the converse of the high price of labour; whilst the extraordinary facilities their railroads and lake navigation afford for getting the produce to the eastern seaboard, whether via New York or the St. Lawrence, enable the grower to dispose of it at once, and the merchant to ship it regularly to the European markets with a certainty of a profit. On more than one occasion, our American friends have threatened to smother not only England, but all Europe, with "breadstuffs," alleging that they had some eight or ten million quarters to spare for the starving multitudes across the Atlantic. Certain it is that our farmers have looked with instinctive dread towards that quarter; and as the glowing reports of coming harvests in the States reach them, have felt a sort of desponding fear that our glorious British agriculture would be swamped by the inundating flood of Kentucky bushels and Western barrels.

Whenever, indeed, a bad crop in Europe has threatened a scarcity of wheat, we have naturally and instinctively turned our eyes to the broad lands of our brother Jonathan. He with the speed of lightning, and under the galvanic influence of the "almighty dollar," generously flies to our relief, and with an abundant supply blesses the eyes and stomachs of our hungry poor. But, on the other hand, when a good crop is reaped on this side the Atlantic, the apprehensions of the agriculturists are excited lest the threatened inundation should then reach them, in the shape of an extra supply from the States, and thus still further reduce the price or hinder the sale of the home-grown produce.

The two last seasons however, have thrown a good deal of light upon this subject, so as to prove to a demonstration that we can grow wheat as cheaply, if not cheaper, than they can deliver it on this side the

Atlantic. During these two years, the supply of flour and wheat from the United States has not been near half the usual annual importation; the quantity for the eight months up to the 31st August, of wheat and flour as wheat, being respectively for each year, 623,194 qrs. in 1856, and only 23,821 qrs. in the present year, making an aggregate in the two seasons of only 647,015 qrs. It is almost unnecessary to state that the reason for this remarkable falling off in the shipments of corn to the United Kingdom is simply because the price has been higher at New York than it was at Liverpool or London, when freight and other expenses were added. At many periods the rates were absolutely higher than the London prices, as is proved by the excessively small quantity imported this year. Certainly, if the accounts from the States are to be credited, this has not arisen from any scarcity of wheat in that country—for it is generally reported that they have an abundance of that grain in the western states—but because the prices in Europe are so low that the merchants will not venture to purchase for shipping to this market. By the last advices, even, the price of flour was from 21s. to 28s. 9d. per barrel, or from 30s. to 41s. per sack, and wheat (white) from 46s. 8d. to 52s. per quarter. These are now the extreme prices of the London market, and much higher than those of the country markets. There is not, therefore, the least fear that importations to any extent will take place from that quarter at present.

But to what cause are we to ascribe the gradual advance in the price of wheat and flour in the United States, and to what extent is it likely to be permanent? There are several causes, the most influential of which are, the increasing consumption, the decreasing production of the eastern states, and the heavy aggregate of expense in getting the grain to the eastern seaboard.

That the consumption of the Eastern States has been for a long while getting more and more a-head of the production is indisputable, and arises as well from the increasing population as from the decrease of production. These two causes operating together render necessary a large annual increase in the supply of wheat and flour from the west. And this is not confined to one or two States, but applies to nearly all the older Eastern States, especially those of New England, comprising New Hampshire, Massachusetts, Rhode Island, Connecticut, Vermont, and Maine. In all

these, hardly any wheat is now raised, although formerly a good deal was exported from them. They now obtain a supply from the west, so far as they require it; but Indian-corn bread is more eaten than that from wheat. In New York the same process of bad farming has produced the same effects; and in Virginia large tracts of land have been so exhausted that they are found not worth cultivating at all, and are suffered to return to their primitive state of nature. This process will probably continue so long as the rich and *untimbered lands* of the west offer so tempting an advantage to the eastern farmers to keep perpetually on the move thither, instead of improving the land that they already occupy. Washington's reason for the small acreage produce of America is still in force: "Labour is so dear with us that we find it more to our advantage to farm a large tract badly than a small one well" *.

With regard to the last cause, the aggregate expenses of transit from the Western States, these, although individually small, which is the boast of the American statistical writers, must necessarily be large collectively. Wheat is cheap enough at Chicago, and there is an abundance of it. But the distance from New York is great, and it has to pass through so many toll-gates, if we may so call them, at each of which expense is incurred, that the price is much enhanced

by the time it arrives at the eastern port. The freight, for instance, from Chicago to Oswego, on Lake Ontario, varies from about 5d. to 1s. 1½d. per bushel; the latter, which is an extreme charge, adding 9s. per quarter to the price; after which it has to pass through the Erie canal and the Hudson, for which purpose it must be unshipped at further expense, and with a new freight in prospect. We cannot, therefore, be surprised at the high price of wheat when it reaches the Atlantic sea-board.

That the population of the States has increased faster than the production of wheat, is proved by the census. In 1840, the population was 17 millions, and the produce of wheat nearly 85 million bushels. In 1850, the population had increased to 23 millions, but that of wheat only to 100½ millions; whereas it ought to have been 115 millions. This deficiency of 14½ per cent. in the supply has occasioned an average advance in the price from 80 cents to 90 cents per bushel, which is 11 per cent. Since 1850 the comparative difference in the supply has been much increased, and the advance in price has been in proportion. There is, therefore, no prospect of any considerable importation of wheat or flour from the States this season at any rate, whatever may be the case in future.

AGRICULTURAL STATISTICS OF ABERDEENSHIRE.

At the meeting of the British Association, Mr. Harvey read the following paper:

He commenced by observing, "The statistics of agriculture of the important county of Aberdeen open up so wide a field that the limits of a paper like the present can scarce give a faint impression of these in their various ramifications, far less carry out to the satisfaction of a meeting of scientific inquirers the detailed information requisite for forming opinions or drawing conclusions thereon of that definite character which are desired. Nor is it in the power of any statist, however qualified, to attain to the most complete accuracy of information on all points which come into calculation in such a matter. The utmost that can be attempted is to give a sketch of the agriculture of the district, casting the eye back to what it was in the earlier stages of its history, and tracing its advancement and extension to the present time, endeavouring to give something like a result of what the labour, the intelligence, and assiduity of its inhabitants have accomplished. Comprising within its limits an area of something like 1,254,400 imperial acres, with mountains ranging to the height of 4,000 feet above sea level, it presents all variety of climate, temperature, and soil. This 1-16th of Scotland was not long since described as, 'with the exception of the low grounds of Buchan, and the highlands of the south-west division,

consisting for the most part of tracts nearly level, but often bleak, naked, and unfertile, though interspersed with many rich spots in a high state of cultivation.' Its conventional divisions are five: Marr—the most mountainous district, abounding in natural forest and lowering hills, where, under the 'steep frowning glories of dark Loch-na-Garr,' our most gracious Sovereign has her Scottish home; Formartine—which joins the coast of Aberdeen. Buchan—next to Marr, the most extensive, with a coast line of 50 miles; The Garioch—at one time termed 'the girmel' of the county; and Strathbogie inland, and less fertile, interspersed with hill, moor, and moss, though in other respects not less famous in history. By the census of 1851 the population of the county was 214,658, of which the very largest portion are entirely dependent on agriculture. The rental of real property may be classed about £540,000, exclusive of the burghs, and the number of parishes into which the county is divided is 88, with some recent subdivisions. With these general observations premised, the more immediate subject of this paper shall be followed out." Mr. Harvey then proceeded to give some details with respect to agriculture in Aberdeenshire at the period when Sir John Sinclair instituted his statistical inquiry, up to which time it had made but comparatively small progress. Having cited statistics for a number of years subsequent to those embraced in that enquiry, Mr. Harvey proceeded: "The genius of Watt revealed the powers of steam, and called it into action, and steam navigation opened Smithfield market and its prices to Aberdeenshire as well as to Norfolk. The drover's occupation was gone. It was no longer the raw material that left for the south, but the finished article of commerce, carrying, as is well known, the

* The average produce of wheat, in different States, according to Professor Jay, is as follows: Alabama and Georgia, 5 bushels. In North Carolina, Virginia, and Tennessee, 7 bushels; New York, Ohio, and Indiana, 12 bushels; Maryland and Vermont, 13 bushels; Iowa and Wisconsin, 14 bushels; Florida, Pennsylvania, and Texas, 15 bushels; Massachusetts, 16 bushels per acre.

highest price in the metropolis. Along with the opening of the cattle trade to London came another change. Up to that time the polled black, the horned Aberdeenshire, with here and there a north country Highlander, were the cattle of the county. Small in size, hardy in constitution, and somewhat slow in growth, they wanted early maturity. The well-known Rainie of Phantassie had gradually been introducing into the south Durhams from England, and the breeding of shorthorns engaged the attention of the spirited Captain Barclay, in the adjoining county, Kincardine. Intermixture of blood gave the requisites, along with careful selection of animals. A bulk and early ripeness was attained which was not before to be had. The keep of years was saved, and the £80 oxen of Skene Keith's day, of perhaps eight or ten years old, are supplied at the age of three. The black polled breeds, save in the upper districts, have almost become the exception, and the mellow red or roan cross breed taken their place. Nor did the change end here; the opening of the cattle trade induced parties, not farmers, to take grass and turnip, and become shippers. Foremost in this were our highly respected, intelligent, and wealthy butchers, who had particular facilities for entering on such an occupation, having the advantage of a home and export trade. By such means great aid was given to the prosperity of the county. A cloud, however, again rose on the agricultural horizon—the lion of free trade roared, and the new tariff carried dismay to the heart of many a farmer, assailed alike in cattle as in corn. It to many seemed as if their last refuge were taken away, and that they were doomed to ruin irrevocably. To reconcile agriculturists to the measure came the drainage loan—science had hinted that produce was stinted because of the stagnant water which made an impervious subsoil give forth its still more noxious constituents, as well as rendering the soil difficult to labour. Abounding in tilly subsoil as Aberdeenshire does, aught that would ameliorate soil or heighten temperature was seized on with avidity, and countless miles have been executed of furrow drains, at a cost which, judging from appearances, does not appear too great. The amount expended I regret I cannot definitely state. Large tracts of land have been added to the cultivation of the county, and seasons have been of late of a milder character. Extending cultivation demanded additional supply of manure from the scarcity and increased value of bones. To chemistry I am here indebted for putting in view the well-known *succedaneum* of guano, of which there is annually consumed in the county about 8,000 tons. Lime is a good deal resorted to, and its consumption for the purpose of manure amounts to about 17,000 tons, while the supply of manure is still further increased by oilcake and other feeding substances, which are used to the amount of some 12,000 tons. The few recent years have operated beneficially in price for the farmer's commodities in Aberdeenshire, and he is now on the eve of having an equal advantage with others—by the intersection of the county by railroads—of attaining any market for his products, and other facilities which these afford. Something of the importance of the cattle stock may be gathered from the fact that cross-bred oxen are occasionally slaughtered at a year old in Aberdeen, weighing, the four qrs., 112 imperial stones, and furnishing about 12 stones tallow, while polled oxen have been raised of the live weight of 18 cwt. 2lb. at two years old; 20 cwt. 2 qrs. 11lb. at three years old; and 24 cwt. 2 qrs. 6lb. at four years old; and the dead weight of another polled ox, without neck or kidneys, was 15 cwt.

2 qrs. 8lb., with 16 imperial stones fat; that the average number of beasts killed per week in the Aberdeen custom is 700, and of sheep 250, and the shipments by steam from thence during 1858 were—of cattle 5,652, sheep 6,622, pigs 1,702; by rail, of cattle 21,502, with the enormous amount of 5,226 tons of dead meat. In regard to grain, for which there is in Aberdeen a ready market, a rather singular feature presents itself. On inquiring into the statistics of the price of grain since the year 1826, there appears a culminating and retrograding gradually every 10 years, giving an average of 30 crops. Bere, 26s. 9½d.; barley, 28s. 3d.; oats, 20s. per qr., with oatmeal 15s. 9d. per boll of 140lb. imperial. Wheat can scarcely be reckoned a staple of the county. In closing these necessarily short and imperfect observations on the agricultural statistics of Aberdeenshire for the lucidation of its present state, there are appended hereto a statement of the probable value of agricultural produce, home stock, &c., framed on the agricultural statistic returns of 1857 (an inquiry which, under no circumstances, ought to have been discontinued), with reasonable value of stock, made after searching enquiry and comparison with personal experience; while the prices for grain and fodder are an average of years of the county. And there is further appended a calculation faithfully made, based thereupon, which will present to view the probable expense and return from agriculture at the present period, that thereby a judgment may be formed of the advance made from the period of Sir John Sinclair's inquiry and calculation in 1798, and of the agriculturist's present position. Shortly stated the Aberdeenshire agriculturists have complied with the conditions imposed on them by him 'to raise a greater produce for the public,' for

The live stock value of 1858 exceeds that of 1798 by	£1,681,941	5	0
The grain crop by.....	689,095	6	1
The green „	621,454	16	3
The grass „	436,956	2	6

Total.....£3,429,447 9 10

for with something under a double acreage stands a stocking of one-third greater value. They have with that fulfilled the second condition 'to pay a better rent to the landlords,' which now, moderately reckoned, well nigh doubles the rent per acre of that period. They have even under larger farms, by more skill, greater economy, and science, brought the land to yield six returns; but that done, the third condition has scarce met its recognition—'that they should live more comfortably themselves,' about 8½ per cent. being all that accrues to pay interest on capital employed, meet extraordinary contingencies, and go to accumulation. The present moment shows this, that with better buildings and great improvements any profit that the agriculturist of this district has, is by his cattle, now at a maximum figure; and that by dint of these he may be said 'to dwell in the presence of his brethren,' but no more. In addition to the probable fall of stock, he cannot but contemplate what is before him. A continuous rise in wages, now exorbitant, the result of emigration and other causes—an increase in outlay for manure for the inferior soils yet to be reclaimed—and enhanced expenditure in all furnishings for the farm, while his grain in maximum, if it does not decrease, remains stationary. He cannot be without considerable misgivings, while together with these stands before him the fact that at no time was there such illimitable demand for the possession of land under all discouragements, and no period when the mercantile free trade policy showed

so much tendency to shake loose the ties which hitherto have bound landlord and tenant together. Yet, under all these circumstances, it is but justice to the body to affirm that, forward in intelligence, and taking courage from a retrospect of the past, they trust that, in the various gradations of all human things, they are not to be overlooked, but, taught the advantage of increased scientific knowledge, they will address themselves assiduously to their duties, and as light after light breaks in upon them, still have the aspiration—'Teach us still more to wonder, more to know.' "

The Very Rev. Principal DEWAR observed that no one could remember the state of agriculture in Aberdeenshire 30 or 40 years ago, who could fail to be astonished at the improvement made by the industry and indomitable perseverance of its inhabitants. A circumstance had been brought to their notice by Mr. Harvey's paper, that the

cultivators of the soil had not been benefited as they should have been by these improvements; he referred not so much to the farmers as to the labourers, and he strongly objected to the recommendation of a very eminent agriculturist—Sir John Sinclair—to diminish small farms and increase the size of farms, as had been going on in Aberdeenshire and other parts of Scotland. The consequence of that had been, first, the demand for exorbitant wages; and secondly, the tendency to immorality. How these had operated he would not then enter upon; but the fact was attested and made public by periodical returns. As to exorbitant wages, if he, a proprietor, cleared all his land of those who were servants for him, and drove them into towns, how could he expect to get servants without paying exorbitant wages? Yet this process had been going on ever Aberdeenshire and other counties.

MICHAELMAS-DAY.

A deadly warfare has just been waged among the genus *Anser*, to supply the ravenous maw of the metropolitan millions; and the aggregated cackling of the goose tribe thus slaughtered would, if heard now, burst on the ear less pleasantly than the boom of "Big Ben." If, as Livy tells us, the geese of Juno saved the Capitol, the geese of the fens of Lincolnshire and the heaths and commons of Suffolk, Norfolk, Berks, and Ireland are a saving clause in the dietary of Michaelmas-day. For still the quaint description of Sir George Head in his "Home Tour in the Manufacturing Districts" holds good; and nearly every paterfamilias, whether his income be large or small, and no matter what his religious or political persuasions, in conformity with custom, at least once in every year, at the head of an obedient family, like a coachman mounted on the coach-box on a gala-day, sits in the pomp of conjugal and paternal affection, knife-and-fork in-hand, behind a fat fragrant goose on Michaelmas-day.

A few days ago the majority of our readers, as well as the metropolitan public in general, were testing the merits of this savoury bird. The Londoners are famous, we are told on high authority, for their devotion to the goose. A million a year are consumed in London; but how many of these fall to the September festival, statistics do not inform us. The French and the Americans beat us, however, in the consumption of geese, proportionately to the population. In Paris fully 600,000 are eaten annually, and in New York quite as many. Considering that in the London markets geese average 1s. a-pound net weight, after deducting the giblets and offal, and may be taken to weigh, one with the other, 10 lbs., for which probably 7s. will be given, we have an aggregate sum of £350,000 spent on this class of food alone in the metropolis. The large breed of geese will sometimes weigh 15 lbs. or more; but the smaller kind are the more delicate eating. Delicacy, however, is often not so much regarded as the beautiful appearance and savoury smell of a "fine fat goose" on the festive-board.

We are not singular in the present day for our reverence of geese. Ancient Egyptian monuments show us geese both alive, and plucked and prepared for the table; and Herodotus tells us that geese were reared in large quantities and held sacred, probably because a favourite article of food with the priests!

We cannot keep geese as they do in the northern regions, where, after being plucked and gutted, they are buried, and, as soon as frozen, keep perfectly sweet through the winter. Our poulters in Leadenhall and Newgate markets would be but too glad if there were some means of keeping the birds sweet and fresh through the close muggy weather.

Railways and steamers have created a great revolution in the sources of supply and the mode of transmitting poultry to market. London is now largely supplied from Belgium and Ireland. Geese are not now driven alive in droves of several thousand from distant counties to the metropolis, but are killed, plucked, and packed off by train.

Old Pennant tells us, that "vast numbers of geese are driven annually to London to supply the market, frequently two or three thousand in a drove; and in the year 1783 one drove passed through Chelmsford on its way from Suffolk to London, that contained above 9,000! Amongst those sent, he adds, were all the superannuated geese and ganders (called the "cag-mags"), which by a long course of plucking prove uncommonly tough and dry. The old birds even now find their way to the London market, although not on their legs, as many a housekeeper, who buys a bargain at the door from an itinerant countryman, may prove. When Willoughby tells us that geese will live to eighty years old, there must be some aged bipeds of the goose tribe in the world, which, after they have been well plucked for years, their owners are still desirous of further utilizing.

Mr. Dodd, the shrewd investigator of the "Food of London," tells us in his curious work, that "London is not supplied with its Michaelmas geese without an awful amount of slaughter: the battlefield being in the fens

of Lincolnshire and in the neighbouring counties. Sometimes there will be 5,000 geese penned closely together, 'cackling their sorrows to the winds, and awaiting their melancholy doom.' When the fatal hour arrives, a boy drives about a dozen geese from a pen into a room; a second boy takes each poor bird in its turn, entangles its pinions behind its back, and inserts its legs into a noose hung against the wall over a trough; a third boy finishes the tragedy by means of a knife. When the bird is dead, its legs are disentangled from the noose, and it is tossed through a window into the plucking room, where, behind a large table, sit several men and women, who speedily become enveloped in a cloud of dust and down; their duties consist in plucking the feathers from the geese, for which they receive a shilling a score. Every goose, so soon as plucked, is thrown upon a dresser, whence a man takes it for the purpose of trussing, and when scores or hundreds have been thus treated, the geese are packed in baskets containing 25 birds each. In the days of broad-wheel waggons, 25 baskets made a waggon-load; if the average weight of a fattened goose be estimated at 10 lbs., each waggon would thus contain nearly three tons of goose flesh: but these goose waggons must now be numbered among the things of the past."

Messrs. B. and S. Beatty and Co., of Cayuga county, New York, who are among the largest poultry breeders of the United States, furnish some general instructions, which are worth republishing here, on the mode of preparing poultry for market:

"Never kill a bird unless it is fat. Never cut off the head of a turkey or goose, but hang them by the heels where they cannot bruise themselves in the death-struggle, and stick them with a small knife and bleed them to death. Ducks and common fowls, if decapitated, should be held or tied and hung up to bleed to death. Never kill your birds with full crops, you will lose in price more than you gain in weight. Never strangle them, so as to leave the blood in. The best plan is to tie all kinds of birds to a line drawn from post to post, or tree to tree, and stick them just in the forward end of the neck.

"You may pick all sorts of birds dry, if you don't tear the skin, but you must scald them afterward by dipping them suddenly in and out of boiling water. Don't scald the legs too much, whether you pick first or afterwards. Be careful of that. You must pick them clean, and the after-scalding makes them look plump and good.

"Never draw a bird. It is worth while to pay freight on the intestines, because the meat cannot be kept sweet long after they are drawn and the air admitted inside of the body.

"It is a practice of some of the best poultrymen, after the birds are plucked, to plunge them suddenly into boiling water, and then immediately into cold water. This gives them a clean, plump appearance, and makes them look fat if they are in decently good condition when killed. Nothing, however, can make a poor bird look well, while ill dressing will make the best look poor.

"Lay the birds upon clean boards, in a cold room, till perfectly cool but not frozen; as at all times, but especially when there is a probability of damp close weather, great care must be taken that the animal heat is out of them; and then pack in boxes with clean rye and oat straw so that they must not touch each other, about three or four hundred pounds in a box, filled full; mark the contents on a paper inside, and on the lid outside, and direct it to your commission merchant plainly, and send it by the express, and the invoice by mail.

"Never kill your birds on a damp day, nor pack them, if you can avoid it, except in a clear dry cold atmosphere; and try to avoid night work, when you are tired and your help sleepy, and all of you careless.

"No matter how light your boxes are, they must look clean, or your poultry will not sell at first prices. In packing, press the wings close, and press the bird down hard on the breast, the legs extending back, and fill each course full, and then lay on straw and another course of birds. Nail tight, but don't let a nail project inward to tear the bird.

"Give your name and residence in full on the bill in the box and on the invoice by mail.

"Never pack in barrels if you can get good dry-goods boxes, as the rolling of barrels injures the poultry. Well-packed boxes of well-prepared birds will keep sweet for a long time in cool weather, and may be transported by express or by rail, and arriving in good order can be sold readily at the highest prices."

We trust that these remarks may enable our friends to secure a good market for their poultry, and cultivate a branch of trade to material profit and advantage.

The late M. Soyer states the best way of killing poultry is to take the bird by the neck, placing the thumb of the right hand just at the back of the head, closing the head in your hand, your left hand holding the bird, then press your thumb down hard and pull the head and neck contrariwise, the neck will break instantaneously, and the bird will be quite dead in a few seconds; when hang it for a short time by the legs for the blood to flow into the head, which renders the flesh much whiter. "In France (he adds) we usually kill them by cutting the throat close to the head. Both methods are good with regard to the whiteness of the flesh; but I prefer the English method, not being so barbarous."

There are other parts and products of the bird useful besides the flesh. The feathers, the down, and the quills have long been articles of great commercial importance. Besides our home supply we import about 4,000 cwt. of feathers for beds, worth £27,000, chiefly from Russia, Holland, and France. Even ten years ago the annual value of the live geese feathers in the United States was set down by the Census Commissioners at £200,000.

Our clever brothers on the other side of the Atlantic, who are always on the look-out for "labour-saving machines," seem to have turned their attention even to the matter of goose plucking. Not that we can always place full reliance on their statements, espe-

cially after the recent Niagara Falls rope-walking exhibition.

The *Scientific American* announces a machine for picking geese, the result of a number of years of labour, and one of the most ingenious pieces of mechanism ever seen. It not only plucks the feathers, but separates the long ones from the short ones, and cleans them perfectly while passing through the machine. It will pick forty-five geese per hour, and must materially affect the price of feathers.

The grey goose quill has been superseded extensively by steel pens; but the consumption of quills for writing is still large, since our foreign imports in 1857 numbered nearly 14,000,000 quills. Some few of these were swan quills, worth £5 to £6 the thousand; but

the great bulk were goose quills, selling at 26s. to 30s. the thousand. The goose-wing is still a common domestic brush for dusting and sweeping in farm houses, &c.; quills are used for fishing-line floats, and for tooth-picks; while we have recently seen in the tobacconists' shops an ingenious application of the hollow bone of the goose-leg, as a tube for tobacco pipes and cigar holders. Goose-grease is excellent for chapped hands, and goose dung for fertilizing the farmer's land. Indeed, in Alsace and some other localities goose quills and waste feathers are spread over the soil as manure, at the rate of 9 or 10 sacks of 50lbs. each to the acre. So much for geese. These facts may at least serve as a rider to the sauce and stuffing enjoyed on Michaelmas day.

AN AMERICAN VIEW OF THE WARWICK SHOW OF THE ROYAL AGRICULTURAL SOCIETY.

Stanford Howard gives the following account of the Royal Agricultural Fair of England, in a letter to the *Boston Cultivator*, dated Liverpool, July 16th:

I have just returned from the Show of the Royal Agricultural Society, at Warwick. It is a grand show—superior, on the whole, to that of last year at Chester, and such, probably, as no other country but England could make. Not that other nations could not get up such an one by contributions from abroad—as France did a few years ago—but that as coming from her own soil and her own people, it could not be equalled.

THE GROUNDS.

The show-grounds consisted of twenty-six acres—somewhat more than was occupied last year, which, by allowing more space for avenues, gives greater conveniences for the people, and gives a more agreeable effect to the general scene. The same excellent order is observed in the arrangement of the different departments that prevailed last year, and the whole moves on with a precision that should be a lesson to my own countrymen in the management of such affairs. This perfection of system is still more entitled to notice at this time, as the Society has lately been under the necessity of changing its principal working officer, Mr. Hudson, who was for several years its secretary, having been dismissed, and who, I regret to say, has since died. The duties of the Secretary *pro tem*, and Honorary Director of the Show and General Arrangements, were efficiently performed on this occasion by Mr. B. T. Brandreth Gibbs, long so favorably known as Secretary to the Smithfield Club.

SHORTHORNS.

In regard to the different classes of animals, we may begin with the cattle, of which the Shorthorns were the most numerous, the entries being 163 for the prizes offered by the Society, and a large additional number for the prizes offered by the local committee at Warwick. They were thought to have more average merit as a class than last year, and certainly comprised many fine animals. The leading prize-takers were Messrs. Towneley, Ambler, Pen-nant and Douglas. The name of Richard Booth does not so frequently occur in the prize-list this year as usual, and some think it is not to be found as frequently as it ought to

be. His magnificent heifer, Queen of the Isles, which last year, as a yearling, was almost universally admitted to be unequalled for her age, is not even named in the list of awards. On comparing her with those which received the honours, it is not easy to understand the decision.

THE HEREFORDS

consisted of about ninety head, and as a class were fine. The average merit was certainly very high, and there was not an inferior animal among them. Prince Albert, Lord Berwick, Messrs. Price, Rea, and Clive were among the principal prize-takers. Several of the animals were of great weight for their size, and of remarkable symmetry. Mr. Rea's three-year-old heifer, which took the first prize in the cow class, was superior in this respect to anything in the whole show. It was stated that her girth at the chine was more than an inch greater than that of any shorthorn cow on the ground. It was also stated that Lord Berwick's four-year-old bull, which took the second prize, measured two inches more than the first-prize shorthorn bull. I do not recollect the precise measurement, but it was over eight feet.

THE DEVONS

were forty-five in number, and of very superior quality, scarcely one among them that exhibited a material fault. They were smaller on the average than last year, and in several instances what many would think too small. The first prize cow, Mr. Merson's, was one of the best I ever saw, of good size and fine form. Messrs. Quartley, Turner, Merson, Farthing, and His R. H. Prince Albert were the leading prize-takers in this class.

It may be well to remark, that no reference was had to milking points in the decisions on Shorthorns, Herefords, and Devons, they being judged for beef only.

LONG HORNS OF OTHER BREEDS.

There were some interesting specimens, the most striking of which were the longhorns, brought out by prizes offered by the local committee. I find myself much indebted to this committee for the opportunity of seeing so many fine animals of this kind. I did not suppose it would have been possible to have found in all Britain so many of such merit. In fact, it is but a few years since we were told, in the English agri-

cultural papers, that the breed was extinct or nearly so. Now we have seen at this show twenty head which are so good that it seems doubtful whether better ones of the breed were ever seen. They appeared to have been brought out without any special preparation, but were fit to be seen anywhere. They were of rather large size—some of the bulls being nearly equal in frame to any Herefords or shorthorns on the ground—generally well shaped, and in all cases excellent handlers. I think it was always admitted that no large cattle excelled the longhorns in quality. The cows were well pointed for milking, and they are said to give the richest milk of any

breed except the Jersey (or the cattle of the Channel Islands), and for quantity and quality of cheese, their advocates declare them to be unrivalled.

AYRSHIRES IN MASSACHUSETTS.

I see I have but a few moments before the closing of the American mail, and must defer further notice of the show and other matters till next week. I will add that I have just put on shipboard twenty-three head of very superior Ayrshire cattle for H. H. Peters, Esq., of Southboro, Mass., a more particular account of which I will give in my next. H.

HARVEST-HOMES AND AUTUMN GATHERINGS.—THEIR CONDUCT AND EFFECT.

The very name of the month that now heads our paper suggests of itself the celebrations with which the season is associated. There is a full, hearty fall in this same OCTOBER, especially grateful to the ear of an Englishman. It is true the word may have gradually lost some of that more peculiar significance once attached to it; but it is still, nevertheless, a time of rural festivity and rejoicing. Never, indeed, was this so methodically carried out. There is far more to be made of a mere harvest-home than many of us would have, a few years since, ever have supposed it susceptible. No doubt much of the bolsterous hilarity of former days has disappeared. The conventional orgies have almost everywhere come to be toned down: and people begin to understand that, after all, theirs is a sacrifice to Ceres rather than to Bacchus. The careful wife or mother no longer dreads the approach of such a holiday, but looks forward even for her own share in it. The clergyman of the parish has little fear as to his welcome, and the Squire enters with no awkward feeling of being "only in the way." Amongst all our efforts for the improvement of the labouring classes, there is none more evident than this. An habitual excess that was at one period absolutely encouraged by the giver of the feast has slowly yielded to a certain refinement and moderation altogether in accordance with the character of the age. A fine gentleman no longer plumes himself upon being a three-bottle man, and by the same showing a good ploughman may be able to enjoy himself without getting drunk. We should be the last to order out "Old October" on the appearance of the ladies and the Vicar: all we stipulate for is, that he should "learn how to behave himself."

There is no question but this reform has been favourably regarded from nearly every point of view. It was a delicate business to interfere with the pleasures of the working man, as it ever has been to intrude much on his privacy. A certain kind of tact was needed that has seldom, we believe, been wanting, and even Doctor Ellis can mount his hobby-horse and marshal his troop of tea-total husbandmen without any great danger. Proverbially loath as a particular school of politicians have been to admit of any good from such

a quarter, the manifestation of this amendment has been generally spoken to. A fine line, to be sure, continues to be drawn between the holiday-afternoon, and any more direct reward for the skill with which the labourer has done his work, or the manner in which he has conducted himself. The latter still continue to be denounced as snarcs and absurdities; the fact being that such proceedings are yet in some quarters identified with a bygone political struggle. The old animus against the Agricultural Society has not even now died out. There is an indescribable feeling that mischief is still meant; and although a Whig landlord may preside, or a manufacturer carry off the best prizes for Shorthorns, the whole thing is looked on as little more than a school for Tory landlords and Protectionist orators. Nothing can be more unjust than this; as nothing ever was suffered to die out more readily than the discussion of a question by those that its adjustment was considered most likely to affect. During the many Agricultural Meetings we have attended for many years, we really remember nothing of a party character, and scarcely anything more political than the maintenance of our army and navy. A succession of events have commonly warranted the reference to our national defences; and we are glad to see, despite the frowns of Lord Albemarle, that the formation of rifle corps has been one of the chief topics under consideration this autumn.

We had almost said it was the only one. So far, "the dinner of the Society" has been more than usually flat and uninteresting. It is this, indeed, that alone can bring such gatherings into ridicule. Had the labourer as little to do with his own harvest-home holiday as the agriculturist appears to have with his agricultural meeting, there might probably be some complaint as to our having overdone it. But it is not so. It is only his employer that the great people override, leaving him not a word to say for himself, or the proper opportunity to say it. This is not the first by many times that we have objected to the manner in which the farmer is pooh-poohed and jostled out of his place on such occasions. It is the old play of "Hamlet" without the Hamlet over and over again. In his stead we have pottering lord-

lieutenants, long-winded rector, fatally fluent Members of Parliament, self-sufficient citizens, and gallant officers, who nine times out of ten speak, every man for himself, without the slightest reference to what has brought them together—or, if there be any, it is very slight indeed. How many reports of local shows have we thrown down this season, with the one same sentence against them, “There is nothing here!” Occasionally, to be sure, a few words may be called out; but these are very exceptional, and in anything but uniform tone with what is going on. Possibly, after all, there may be nothing to talk about. Agriculture goes on very well as it is. Prices are good, and rents paid. Improvements are effected, and terms and covenants everywhere satisfactory. The exhibition of stock and implements, useful as it might have been, is still scarcely worth speaking of. The object of the Society is too well known to be discussed. Neither landlord nor tenant has anything to learn of each other; or if they have, this is hardly the time to hear it. Or possibly, again, the farmers are no talkers. They certainly have very little practice. We have, however, known them drawn out under proper encouragement, or when left more to themselves. And let it ever be remembered, that some of the best “movements” we have had have originated in good sound practical remarks offered by those best qualified to give them. Amongst no class, either, is mere “make-believe” of such little avail; and, consequently, the gentleman who is considerate enough to get up something *apropos* rarely does much with it. His “two blades of grass growing where one grew before”—“his sword of Cincinnatus”—or even the great climax to his address, the five-pound prize he is going to present them—don’t tell. In a word, the farmers must have more to say for themselves at these anniversaries, or we shall have them again held up to the world as mere shews of country squires, and so on. Once it was the prize labourer, and now it is the prize landlord. We wonder when the tenant will have a turn!

We repeat that all this must be taken with a certain degree of qualification. The original animus is bad and unfavourable. Still there is something in it. For our own part we should be the last to confine such meetings to the tenantry only. There is no better opportunity for the two classes coming together than at such a county gathering. But they must come together on fairer terms. We are not quite sure but that the public duties of the day might be more equitably divided. It is not an absolute necessity, for instance, that a noble lord or an honourable member should always occupy the chair. Could they not be content now and then to come as welcome guests? There is something already in the way of precedent for what we speak to. The Ludlow Society has a custom of choosing its president from amongst the working committee; and at the dinner of last week, Mr. Stedman, of Bedstone, took the chair. But the character of the company is by no means lowered by the action of such a rule. On the contrary, Mr. Stedman was supported

right and left by Lord Powis, Lord Newport, Sir Baldwin Leighton, Sir Rouse Boughton, Colonel Percy Herbert, Mr. B. Botfield, M.P., and other proud Salopians. We are rather inclined to think that many a country gentleman would attend these dinners all the more readily if the committees were not generally so anxious to put some such office upon him.

It is very plain that more good ought to come of these meetings, or rather of these dinners. The proceedings of the morning, the show of stock and the working of the implements might surely find material for a little seasonable talk. Then, the great agricultural questions of the day, the progress of steam power, the new system of cropping, the diseases of roots and so forth, might all or any come in for a turn. Farmers are almost the only people that at such a time it seems cannot talk of their own business. We do not say who is to blame, but we fancy something might be put either way. The landlords need not be quite so ready to go into harness, and the tenants not always so solicitous to put them there. Some people seem to think a great man cannot be made welcome without you give him a speech; and officious nobodies run in and out, announcing that Lord Longyearn is in the yard, or the rev. Mr. Rigmorole is “coming;” and down he goes for a speech accordingly. Let the management act with a little more determination, and before putting any one down in this sort of way, let them consider what he is capable of saying and doing at an *agricultural* meeting.

ADVANTAGES OF UNDER-DRAINING.

1. It prevents drought.
2. It furnishes an increased supply of atmospheric fertilisers.
3. It warms the lower portions of the soil.
4. It hastens the decomposition of roots and other organic matter.
5. It accelerates the disintegration of the mineral matters in the soil.
6. It causes a more even distribution of nutritious matters among those parts of the soil traversed by roots.
7. It improves the mechanical texture of the soil.
8. It causes the poisonous excrementitious matter of plants to be carried out of reach of their roots.
9. It prevents grasses from running out.
10. It enables us to deepen the surface soil—by removing excess of water.
11. It renders soils earlier in the spring.
12. It prevents the throwing out of grain in winter.
13. It allows us to work sooner after rains.
14. It keeps off the effects of cold weather longer in the fall.
15. It prevents the formation of *acetic* and other acids, which induce the growth of sorrel and similar weeds.
16. It hastens the decay of vegetable matter, and the finer comminution of the earthy parts of the soil.
17. It prevents in a great measure the evaporation of water, and the consequent abstraction of heat from the soil.
18. It admits fresh quantities of water from rains, &c., which are always more or less imbued with the fertilising gases of the atmosphere, to be deposited among the absorbent parts of soil, and given up to the necessities of plants.
19. It prevents the formation of so hard a crust on the surface of the soil as is customary on heavy lands.
20. It prevents, in a great measure, grass and winter grains from being winter-killed.

THE EMPLOYMENT OF STEAM MACHINERY IN AGRICULTURE.

Especial attention has been called of late to the great auxiliary power of the age. This, however, has not been with the most favourable bias. One injury, it has been said, will serve to outweigh a whole multitude of benefits, and the services of steam would seem to be more or less susceptible of somewhat similar appreciation. "If thy right hand offend thee, cut it off." Accidents on railways are unfortunately too common to command much notice. We are still content with an inquest, a fine, and a reprimand. But the sad and ever-memorable disaster on board the *leviathan ship*, occurring under the circumstances it did, at once set people a-thinking. We began to feel, at last, how terrible was the strength of our slave if carelessness or mismanagement suffered it to be once turned against ourselves. We must use it now—and only use it with the full cognizance that it is powerful alike for good or for evil, and that the least slight may direct it in a moment from the one to the other. We believe, ere this, that the last of that curious race are gone from amongst us, who never had a black neck-cloth, always wore top-boots, and had never been in a railway carriage. Still there may be occasionally something of a reaction. It will take time to thoroughly re-establish public confidence in the "Great Eastern," and a crash on the line tells on the dividends in many more ways than the mere charge of costs and damages.

Perhaps the agency of steam has never been more safely employed than in the pursuits of agriculture. It is true that its introduction here has been only very gradual; although this alone may go far to account for the impunity with which so proverbially dangerous an ally has been secured to us. Seldom has the farmer determined on the purchase of an engine until he has made himself acquainted with its management and capabilities. Even further, he as rarely brings it home, but he engages an engineer from the works to instruct his own serving-men in its proper conduct and administration. It is all to the credit of the agricultural labourer to add that he has, even at this comparative outset, ably responded to the call made upon him. We argue still, and sensibly enough, that he must be better educated to meet the increasing demand upon his intellectual capacity. But as it is, he has at least been well represented. We will not venture to say that the common run of farm servants are equal to the care of a steam engine; although on the other hand, such faith as has been reposed in them has seldom indeed been misplaced. We hear continually of the recklessness of drivers, the carelessness of stokers, and so on: it is almost impossible to open a paper without reading of some melancholy mishap, where steam has gone wrong by rail or river. On the contrary, any such an accident on the farm is as un-

usual as it is elsewhere of common occurrence; and yet we now have the engine in almost as general use as the plough. We watch the smoke coming up from remote corners and out-of-the-way holdings: we find Clayton and Shuttleworth comfortably housed so far from home that we wonder however they got so far; or Tuxford's, or Hornsby, turning their prize plates upon us in regions where we should have thought no power in the world could have penetrated. In fact, steam when only associated with agriculture surely bears a charmed life. We talked of the stupidity of the labourers, and they encounter it intact and invulnerable. Insurance offices threatened to raise their rates when put in proximity with so inflammable an agent, until quickly brought to see that no harm comes of it, and that everybody uses it. The sacrifice of life and property has been about proportionate, and, if we could only command the returns, it would be extraordinary to see how little the farmer has suffered in comparison with other classes.

But at length Steam has claimed his victims even from amongst those he has so long favoured. The boiler of an agricultural engine has burst, and a lamentable loss of life has been the consequence. Still, it must be borne in mind, this did not happen on the homestead, with the machinery in the hands of the occupier and his own people. On the other hand, the accident occurred with an implement that was on public exhibition at the time, and under the control of a professed engineer in the employment of the firm which sent the engine to Lewes fair. A full report of the calamity will be found in the following pages. What we wish here to counteract is any undue effect which may be attached to such a misadventure. The employment of steam machinery in agriculture has, we must most emphatically repeat, been attended with the utmost safety and success. So far from the farmer and his servants having proved unequal to cope with it, none others have directed its wondrous power with more care and less cost. Even this accident, we must say again, has little or no such application. The engine was in the hands of a manufacturer and his staff. And yet we do not speak too soon, when we find a daily paper prefacing its report of the inquest with such commentaries as these: "It is feared that the accident will give a great check to the employment of steam-machinery by farmers, many of whom have been heard to say they shall revert to horse-labour." And, again: "Great alarm is felt at the fact of one of these agricultural steam-engines exploding, because it is evident that the men under whose management they are placed are not competent engineers, but the best and most intelligent of the farm-labourers." The facts of the present case make this scarcely logical, for the account goes on to

say: "It was, however, the engineer of the manufacturers who was attending the engine at the time of the explosion." In a word, a very great amount of experience tends to assure us that "these agricultural steam-engines" are safe with "the most intelligent farm-labourers," and that almost the only very serious accident with one of them has been when it was in the charge of "competent engineers." There are many causes and reasons why an engine might explode when on public exhibition, that would not, if merely in everyday use.

But even this might be entertained with every credit

to our manufacturers generally. There is scarcely anything that is more constantly on exhibition and in competition than the steam-engine. For many years and for a variety of purposes it has been one of the chief attractions of all our Agricultural Meetings, either large or local; and yet we remember no such accident as this in all our knowledge of such gatherings and trials. Indeed, the catastrophe at Lewes Fair must be regarded as altogether exceptional; and it may be impolitic, if not impossible, to make more of it than what common caution shall already have suggested.

FATAL ACCIDENT AT LEWES FAIR.—EXPLOSION OF A STEAM ENGINE.

At the Lewes fair it is customary for the agricultural machinists to have a display of implements and machinery. At the last, however, the only steam thrashing machine exhibited was that belonging to Messrs. Cheale and Sons, of Southover (manufactured by Hensman, of Woburn, Beds), which was placed not far distant from the wattles on the eastern side of the Wallsuds. It appears that owing to the heavy rain which fell on Wednesday there was no opportunity for getting the steam up till after mid-day, when the clouds broke and appearances indicated fine weather. At this time the engineer began to get up his steam, and this attracted a considerable number of persons to witness the action of the machinery. Unfortunately it had not been long in work before the boiler burst, with a loud explosion, scattering death and destruction around, and creating a feeling of despondency amongst the assembled hundreds on the ground, and a most distressing sensation throughout the town.

The weather up to twelve o'clock was very wet and boisterous, but at noon the sun appeared, and the engineer prepared to get up the steam to exhibit the application of his engine to driving various machinery. All appeared to be going on smoothly, when a tremendous report was heard. This was speedily discovered to be the explosion of the engine, which instantly rose from the ground amidst a dense cloud of steam and smoke, and passed through the air a distance of between thirty and forty yards, when it struck the ground and twice rebounded a distance of between fifteen or twenty yards. The scene which now presented itself was of a most heart-rending description. John Gold, the engineer, who had been thrown a considerable distance from the engine, was found dead upon the ground; Reuben Lempert, labourer, of Findon, and Jesse Upton, labourer, of The Cliffe, Lewes, who were standing a short distance from the engine, were also found to be dead; while Albert Hilder, a young man from Horsted-keynes, was seen struggling in the last agonies of death. A boy named Thomas Woodhall, about 12 years of age, in the employ of Mr. Faller, Norton Farm, near Brighton, had been dreadfully scalded; and a number of other persons more or less seriously injured. William Sayers, cowman, of Hurst, was cast about 50 yards by the force of the explosion; in the course of a short time, however, he had so far recovered as to render it safe to remove him to the County Hospital at Brighton. A labourer from Newick, named Cox, was likewise dangerously injured; he, too, was removed to the hospital in Mr. Holmes's break. A fine colt, shown for sale by young Hilder, and two sheep, were also killed; other sheep were more or less injured. Mr. Cheale, who had been superintend-

ing the engine, and other machinery in the field, was knocked down behind a chaff-cutter, which he was preparing for work, but fortunately escaped without any serious injury, and was able to attend the inquest.

Mr. F. H. Gell, County Coroner, held the inquest at the Elephant and Castle, at four o'clock on Thursday afternoon.

After swearing the jury, he said they were about to enter upon a very important investigation—important both as concerned the public and the parties interested. The use of steam-engines for agricultural purposes had now become so general, that they could not inquire too minutely into the circumstances attending the accident. He would not presume, in the present state of the case, that any one was to blame; but it would be necessary, in the event of any ulterior proceedings being taken, that they should have the best information as to the cause of death. He did not think it right to anticipate the evidence in any way, because it was much better that it should fall fresh upon their minds. As he had just said, however, in case any future proceedings should arise out of the accident, it would be better that the precise cause of death should, if possible, be pointed out by one or two medical men, who should accompany them to view the bodies of the deceased, and point out the injuries which had resulted in death.

After some evidence as to the identity of the deceased,

Dr. Smythe was examined: He said, yesterday, about ten minutes after one o'clock, I was sent for to the fair. I rode there directly. I saw one man, a stranger to me, but whom I have since ascertained to be Jesse Upton, being carried on a hurdle to Lewes, dead. There were also two others quite dead, Reuben Lempert and John Gold. Albert Hilder was living, but died a few seconds after I saw him. I also saw a boy, named Woodhall, who had been scalded. I did not see the two men who were taken to Brighton. The three dead bodies were much mutilated; the deceased appeared to have died almost instantaneously. The injuries were such as might have been produced by the fall of an engine, or any ponderous body, upon them. I remained with Hilder during the few moments he lived. To-day, with Mr. Murrell, I have examined the four bodies lying in the adjoining room. They are those of John Gold, Jesse Upton, Reuben Lempert, and Albert Hilder. With respect to Gold—(we have only recorded those injuries that may have produced death)—he has a fracture of the right thigh, a fracture of the joint of the right knee, a lacerated wound of the pelvis, a compound fracture of the thigh bone, fractures of the frontal and temporal bones, exposing the brain. Those I believe were the causes of death; the injuries about the head were the immediate cause of death. Any one of the injuries would have been very serious—hardly one of them that might not have produced death ultimately, so extensive were they. As to Jesse Upton, extensive fractures of ribs on both sides, producing injury to the lungs and heart. The injury was quite suffi-

cient to have produced immediate death. Reuben Lampport's injuries were principally in the head; extensive injury to the head, lacerating the brain, and quite sufficient to produce immediate death. The next body is that of Albert Hilder—left jawbone very much fractured, severe scalp wound, and fractures of other bones, compound fracture of left wrist joint, extensive lacerated wound of hand and wrist. Death in this case was more immediately caused by the injuries to the head.

By the Foreman—A piece of iron blown away from an engine might have caused the death of Hilder.

By Mr. Briggs—The whole of the injuries I saw on Hilder might have been inflicted by the same piece of iron, but it must have been a large piece; or indeed several pieces might have struck him.

Mr. W. H. Murrell, surgeon, examined—About a quarter past one I received a message to go to the fair, as a severe accident had occurred. I directly mounted my horse and rode towards the ground. On my way I met the body of Albert Hilder, which was being conveyed to the Elephant and Castle, and, at the request of the policeman, I accompanied the body to the inn. Having been told that there were other medical men on the ground, I waited at the Elephant and Castle, and there received the bodies of Gold and Lampport. They were all dead. I have this afternoon, with Dr. Smythe, examined all the four bodies. I have heard the evidence of Dr. Smythe, and I perfectly agree with what he has stated.

A question was here put by a jurymen as to the probable cause of death.

The Coroner remarked that conjectures might easily be raised as to the cause of death.

Mr. Briggs said he took it that the injuries in Hilder's case might all have been inflicted by a large piece of iron.

By Mr. Briggs.—Decayed had a serious blow at the back of the head.

Mr. Briggs wished to mention a matter of some importance to the jury. After the accident, a portion of the engine had been removed by one of Mr. Cheale's men; but Mr. Cheale had since had it removed to these premises, for the purpose of having it handed over and placed in the custody of some responsible person. Part of the engine had been blown in one direction, and part in another.

The Coroner said the jury would probably wish to view the place of accident with the part of the machine still on the ground again before the inquiry was brought to a close.

Mr. Briggs said that all he wished at present was that some responsible person should have charge of the machinery.

The parts of the engine on the premises were then brought into the room; and, after a short conversation, Capt. Mackay, who had entered a short time previously, undertook that his men should take charge of and watch the machinery.

The Coroner said he had already prepared a letter to the Secretary of State, who would probably send down a civil engineer to examine and report upon the engine.

The inquiry was then adjourned.

On the inquest being resumed, the Coroner stated he had received a letter from the Railway Department of the Board of Trade, announcing that it was not the intention of the Government to send down an inspector to assist in conducting the case. Under these circumstances, perhaps, the jury would feel it desirable to secure the attendance of some professional man.

George William Bailey examined by the Coroner: He said he was a miller, and attended the sheep fair at Lewes on the 21st. About a quarter of an hour after the explosion occurred he had a conversation with a man named Plumber, who told him that shortly before the accident he had noticed that the pressure upon the engine was 30lb. per square inch, and he had tried to lift the safety valve, but found himself unable to do so. He added that no steam came from it previous to his lifting it. Plumber subsequently repeated his statement in the train in going from Lewes to Brighton.

By Mr. Briggs, for Messrs. Cheale: No one was present during the first conversation, and witness did not remember the precise words that Plumber used. No remark was made as to the cause of the accident, nor did Plumber state that the safety-valve was in an improper condition for working.

Albert John Skinner said, he was standing about a yard and a-half from the engine at the time the explosion occurred. Gold was driving the engine, and witness saw him turn a tap on the right-hand side of the engine, which permitted a little

steam to escape. He then stirred up the fire and soon afterwards the explosion took place. Witness noticed a little water drop out of the whistle, and heard Gold say that he must soon start her. He sustained some trifling injuries in the face.

John Heywood examined: Was in the employ of Messrs. Cheale, as foreman, and undertook to drive the engine that exploded, in conjunction with John Gold. He was not with the engine on the day of the accident, and did not examine it before it was sent to the fair. Immediately after the accident occurred he was ordered by Mr. Cheale to go up to the engine to clear away the pieces of the chaff-cutter. A cart was in the field to carry them away. He obeyed his instructions, and picked up several pieces of the chaff-cutter, as well as the safety-valve of the engine. He did not examine the safety-valve, and consequently could not say whether it was in a fit state for working or not. He had known Gold for many years; and, as far as he could form an opinion, Gold was quite competent to undertake the management of an engine.

By Mr. Gerrard: I do not remember telling any person since the accident that Gold was not a fit person to drive an engine—that he was flighty, and too much in the habit of getting up too much steam. Before the accident I did make a remark to my father to that effect respecting Gold. The remark, however, was made under excitement. When I have been with him he had driven at such a rate that I have refused to feed unless he kept the steam down.

By Mr. Hilman: I do not consider myself an engineer, but merely an engine driver. My experience in engine driving has extended over a period of 14 months.

By Mr. Briggs: I have more than once had occasion to ask Gold not to drive so fast, or he would shake me out of the box. I do not know that he ever pushed the steam beyond the safety-valve, but I have repeatedly heard it blowing off. I have known him work the engine beyond its capabilities, and I have also seen him alter the lever so as to enable the engine to go faster. Before starting the engine, the boiler was filled with water. I saw the engine tried twice in steam, and on each occasion the safety-valve was fixed at 45. At that figure the steam would blow off. When I picked up the safety-valve I believe it was lying about six or seven yards from the engine.

By the Jury: The engine always did its work very well. When I remonstrated with Gold as to his driving I apprehended personal danger if he continued the speed at which he was working the engine. Gold was a steady man, and was not given to drinking when he was out with the engine. I never heard Gold express any fear of the strength of this particular engine. I have worked several engines, but I never found the safety-valve stick when it had not been used for a few days. When we have had dirty water we have often taken out the valve and wiped it before starting. My wages from Messrs. Cheale are 24s. a week.

Michael Baker, a whitesmith, said he was upon the hill with Mr. Garnum shortly after the explosion. They had some conversation, when Garnum said he had seen the steam coming out between the plates, and asked witness to go round to the engine and see the place. Witness did so, and Mr. Garnum pointed out the place.

John Badler, of Brighton, foreman of the locomotive department of the Brighton Railway, was then examined. He deposed that in November last he received a portable steam-engine from Messrs. Cheale for the purpose of having it repaired. He received instructions to repair the fire-box and put a few new ferules on the tubes. He was also requested to test the boilers by hydraulic pressure. He put three additional plates and six extra stays on the fire-box, and then tested the boiler to a pressure of 80 lbs. He also put a ferule on the spring-balance, so that a pressure of more than 45 lbs. could not be obtained in the boiler. When the engine was returned to Mr. Cheale it was perfectly safe. Since the accident he had examined it. He found the outside shell of the fire-box blown completely away. It appeared to have given way at the root of the angle iron. At the police-station on Saturday he was shown the safety-valve. It appeared perfectly free and uncorroded. It did not seem to have been in the slightest degree fast, and so far as he could form an opinion it was in a proper working condition. He also saw the spring balance, which was disconnected in consequence, he presumed, of the force of the explosion. It

still had the ferule on it which he put on at Brighton. From the examination he had made of the engine he had arrived at the conclusion that the accident had either arisen from over pressure or from inferior materials. The material of the boiler, so far as he could judge, did not appear to be very good. He thought it required strengthening by additional stays. While the engine was undergoing repairs he had not looked into the boiler, and therefore could not say what stays there were in it. After testing it at 80 he considered that it would fairly bear a pressure of 45 lbs. He thought it would have been quite safe to work it at 45 lbs. pressure. The stays he put in were longitudinal stays, but there ought to have been a few more stays in the fire-box. As a general rule he considered it advisable to employ an indicator on the engine. The spring-balance, however, if properly attended to, would indicate what pressure there was in the boiler.

By the Jury: Messrs. Cheale's instructions respecting the repairs were given in writing, but were of a special character. He did not understand that he was to do everything that was necessary to put the engine in a satisfactory state of repair. It would have been impossible to detect the inferior nature of the material unless there was a fracture. He considered hydraulic-pressure of 80lbs. to be equal to 80lbs. steam-pressure. The boilers of the Brighton Railway Company were tested at double the pressure they were intended to be worked at. Messrs. Cheale's engine was made to work at 70lbs., but he reduced it to 45, because he thought that portable steam-engines never worked at a higher pressure. The pressure in a boiler was equal all over, and would not be greater at the centre than any other part. When the engine was sent to witness for repairs he saw that it was not a new one; but he did not think it was so old that it was not worth while to lay out any more money upon it.

Isaiah Cheale said: I am a partner in the firm of Cheale and Sons, agricultural-implement makers, Southover. On the occasion of the sheep-fair at Lewes, on Thursday, I sent several implements there for the inspection of farmers and others, and among them an agricultural steam-engine. Before sending it away I filled the boiler with fresh water. The engine appeared to be in proper working condition. It was sent in charge of one of my men, but I do not know which. I was not at the fair myself, and consequently did not witness the accident. I was prevented from going by the roughness of the weather. I had worked the engine to the highest pressure five weeks before. That was about 45lbs. to the square inch, and the safety-valve blew off steam at that pressure. I did not make the engine, but bought it at an auction at Hever Castle, Kent. The engine had been out about four years; it was made by Messrs. Hensman and Sons, of Woburn, Bedfordshire. It has done about two days' work since I have had it, and as soon as I had got it home I examined it minutely, and entered into communication with Mr. Craven, superintendent of the engineering department of the Brighton railway-engines, with respect to some repairs to the boiler, and placed it in his hands. Among other instructions I told him to thoroughly test the strength of the boiler before he sent it back to me. It was returned to me on the 27th of last November, with a certificate to the effect that they had repaired the boiler, and tested the boiler to 80lbs. the square inch by the hydraulic-pump of the London, Brighton, and South Coast Railway. He put the engine together, and afterwards obtained permission from Mr. Vowles, a farmer of Southover, to work it with his thrashing-machine, and he then found that the steam blew off at 45lbs. There was some defect in one of the slide-valves, so that the engine did not make the most of the steam that was generated. I faced that valve so as to make it steam-tight. It has not been used by me more than one day since it has been in my possession.

By Mr. Brigg: The valves attached to the engine are the safety-valve, the throttle-valve, the salter-spring balance, and the water-gauge; there are two more safety taps, one called the steam-tap and the other the water-tap, to ascertain the condition of the water in the boiler in case any accident happened to the water-gauge. When the engine first came into my possession the safety-valve was capable of being screwed down to a pressure of 70lbs. on the square inch, but when it returned from the Brighton Station it was altered so as not to screw down beyond 45; and if it was in good working condition the steam would blow off above 45. I cannot see any defect whatever in the iron.

The various pieces of the engine spoken to by the witness were brought into court and explained to the jury.

Examination resumed: The man who filled the engine in the morning of the accident poured too much water into the boiler, as was shown by the water-gauge, and I took out two or three pailfuls. That would leave between two and three inches above the top of the fire-box before the engine was started and before any fire was put in. I saw the fuel for the engine put up in a cart, and a few shavings to light the fire with. I sent one sackful of coal, together with some brought out of the house. Probably about 32½lbs. of coal only were consumed, the other being brought back. The horizontal and perpendicular parts of the boiler were fastened together by an angle iron, to which the plates are riveted, and the fracture in this instance occurred in the angle. Generally speaking, the angle iron is the strongest part of the boiler. I find that this angle is not so good as is used now. It has not so much "root" to it; but it would, nevertheless, require very strong pressure to have burst it. On the day of the fair the only work which the engine had to do on the hill was to drive a chaff-cutter, under a pressure of 10lbs., and there could have been no inducement for the engineer to play any tricks with it. John Gold, who worked the engine, has been in my employment, off and on, for 20 years and upwards. He used to work a good deal as a fitter and turner in my fitting shop, and I found him a general handy man: he used to do pump work, wire work, painting, and all kinds of things. I commenced to use steam locomotive agricultural engines six years ago. I sent out Gold first to feed the engine, and he undertook to take turns in the working of the engine. He became very competent, and was sent out to instruct others. He had been several times sent out to fix new engines, and superintend them until he had instructed others. He was completely competent to work such an engine, and would have been working it that day at a farm had it not been for the wet weather. Gold left my premises on Thursday from a quarter to eleven to eleven. Small engines generally have not got a stay running right through from front to back.

By Mr. Hillman: Gold was with me on both occasions when at work. It was usually covered over with sail cloth. Five extra stays were put by Mr. Craven, and he also rendered an accident less likely by preventing the safety-valve being screwed down to obtain a pressure beyond 45lbs. to the square inch. I gave £34 for the engine.

By the Jury: It was a 4-horse power engine. Gold was like some other men, he got tipsy sometimes, but he had not lost a day for the last two months through drunkenness. He used to earn 24s. a week when he was out, beside his board. When he was in the shop he had 18s. a week. On the morning in question he was perfectly sober. The engine blew off freely at 45lbs. when I used it. It was not a very saleable article, because it only worked a portion of the farm implements, whereas the present implements that are let out will clean the corn and put it into the sack fit for market; therefore there was no great demand for this, which only did a portion of the work. The engine had no pressure gauge, and not one in a hundred of these portable agricultural locomotives has. It would be a great means of securing safety if they had. I should think that hydraulic pressure as a test would be better than steam pressure, because water is less elastic than steam; but I am not aware that Ransome's people use steam pressure as a test. Occasionally a spring valve will get set, when the engineer should give it a knock, and it would release itself. Gold generally went out to work a 7-horse engine which we let out. I am aware that an engine of a similar kind, and made by the same maker, burst about two years ago at East Grinstead. The construction I put upon the fact of Mr. Craven having put the pressure to 45lbs. was, not because it was not able to bear more, they having tested it to 80lbs., but because, as a general rule, the Royal Agricultural Society did not admit any competing high-pressure steam engines in which the pressure was more than 45lbs. to the square inch, and not because they considered it weak. I had no means of ascertaining whether the angle iron was good iron or not. The general practice now is to overlap, which renders the angle stronger. If any one was malicious enough to weight the valve or put a wedge under the lever, then it might go on producing steam until the pressure would be such as to blow the boiler to atoms. I do not at all know what has been the cause of this accident. At first I thought Gold

might have been heaping on fuel, but I find so little used that I could not attribute it to that.

By Mr. Briggs: A series of experiments has been made by Mr. Fairbairn to ascertain the ratio of time that it would take to generate steam in a close boiler with a full fire, and it was found that it would take 20 minutes to increase the pressure from 11lb. to 100lb. per square inch. There must have been a great pressure upon this boiler before it burst.

Mr. David Cheale (son of the last witness) said that he was in partnership with his father, and on the morning of Thursday he went to Lewes sheep fair, and saw the engine on the ground before the explosion. This was about eleven o'clock. No person was with it at that time. The engine was standing about 20 or 40 feet from some hurdles, and there was a foot-path between them and the engine. He assisted Gold in uncovering the engine and getting it ready. Gold having oiled the bearings, put some straw into the fire-box, and about twelve o'clock the fire was lighted, and he (witness) left the engine under Gold's sole control. Witness saw the engine again a quarter after twelve. Gold was with it at that time, but no one else. I then went down to a booth to get change for a sovereign, and returned about half-past twelve. I went up towards the engine, and saw Gold. I asked him how soon he would be ready to drive a chaff-cutter, and he replied that he had not sufficient steam as yet. Witness was standing by the chaff-cutter, and Gold lifted the safety-valve, and he walked further round the engine and turned a tap; and about ten minutes after that the explosion took place. He was still standing near the chaff-cutter.

The Coroner: Did he do anything else?

Witness: I saw him round by the pen, but I could not see what he did. When I asked him if he was ready to work the chaff-cutter, he said that he could not get the fire up, that the coals were damp, and he could not get the fire to burn, that it might be another five or ten minutes before he could get the steam up, and almost immediately after that the explosion took place. I was knocked down by the chaff-cutter, which was blown to pieces, and when I got up I found Gold lying dead on the ground. Some person said, "Fetch your horse and cart," and he went for it. That was to take the bodies away. I saw no more of the accident. When I stood by the engine before the explosion I saw there was water in the boiler by the gauge, and I also noticed that when Gold lifted the valve steam issued. I heard it as well as saw it.

By Mr. Briggs: This valve was lifted ten minutes before the explosion took place. Previous to the fire being lighted, I said, "Keep a slack fire, Gold; because, if the weather does not hold up, we shall not be able to keep the strap upon the cutter." I saw a great deal of black smoke coming from the chimney after Gold had tried to light the fire. When the engine is moving the steam passes through the chimney, and the fire is consequently greatly excited by the draught; but that is not the case when the engine is not working. The engine was standing quite on a level, and some men were engaged in cutting away the ground under the wheel; the foremost wheel had been cut under, and the sinking of the engine would be quite sufficient to set the water in motion, and make a difference of an inch or two in the water over the top of the fire-box.

By Mr. Hillman: I had not requested Hilder to move away because I apprehended there might be an accident, but I did so because he kicked over my plough. No complaints were made, or fears expressed, that the engine was not safe. It had not been examined and refused that day, because it was pronounced to be unsafe. It was there for sale, or to let.

By the Coroner: After I returned from Southover I requested the police officer to take charge of the engine.

By the Jury: I could not form any idea of what pressure there was on the engine boiler at the time that Gold lifted the safety-valve. He said he had not power enough of steam to drive the wheel, and he tried to turn it with his hand, but the engine would not start it. From what I could see the steam never was up to 45lb. pressure on the square inch. Gold was busy with me the whole time, lifting and setting other machinery. I did not see any one fetching him any beer.

By the Coroner: I am not able to form any opinion as to the cause of the explosion.

William Brown, a labourer, who witnessed the catastrophe,

swore that he saw Gold previous to the explosion try the safety-valve, and that a small quantity of steam came out.

Spencer Stephenson sworn: On the 21st of September I was on the hill, and saw an agricultural steam-engine there in charge of Gold. I had some conversation with him. I saw him turn a cock, and he said, "We've not half got her up," or "She's not half up," or something of that sort. I saw him put some coal in the fire-place, and very shortly after that the engine exploded. I was blown away. At the time I was standing within three feet of Gold. I remember just seeing the flashing of fire from the engine, and shortly afterwards I found myself about ten yards distant from where the engine was. I felt a shock, but a piece of tarpaulin that was there flapped around me, and probably saved me. I saw Gold put five shovelfull of coal into the fire.

Henry Plummer, an attendant upon the agricultural steam-engine belonging to Mr. Weeks, stated—I went up to the engine before it exploded, and put my hand upon it. The fire, I think, had not been lit long, and I should not have thought that there was any pressure of steam at the time. The gauge was screwed down from 25 to 30lbs. on the square inch. There was a slow fire in the fire-box, and I thought the fire had not been long enough in to produce steam of very great pressure.

Stephen Goodman, fireman of the county prison, stated that he knew the deceased John Gold by sight, and that he was in charge of the engine at the Lewes sheep fair. He also saw Gold stir the fire, and get the engine ready; and he saw him open the steam-tap, and the steam came out in pretty great force. He did not make any remark about it, but he thought it was not very safe to stand by, so he turned round, and walked away. No steam escaped from the safety-valve at that time. He saw steam issuing from a crevice in the plates, and he was sure that he should know whether it was issuing from that crack or from the wet surface of the boiler itself. Stood close to the engine at first, but thought it would be safer to move away.

W. C. Wells said that from the force with which the explosion occurred it was evident to him that the pressure must have been very high, probably 50lb. or 60lb. to the square inch. All safety valves were liable to set, and required great care in watching. He was not able to tell what would be the force of the resistance of the particular iron used in the construction of this boiler.

By the Jury.—Sometimes cheap engines were made without a pressure-gauge, but no boiler should be made without one, because, in case the safety valve set, and the pressure in the boiler got above the point indicated by Salter's patent gauge, there would be no means of indicating the pressure on the boiler.

Mr. J. Jackson, an engine-maker at Brighton, who witnessed the explosion, said that he had examined the engine, both before and after the explosion. After the explosion he found the outside fire casing was blown out, and the wheels blown off. In his opinion the boiler was deficient in stays, and it never ought to have been sent out of the workshop without their being put. He had a similar boiler to this in his possession, which he strengthened by extra stays. All flat surfaces were stayed, or ought to be. He should not think a pressure of 45 would have caused the fracture; but it would not have been safe to have worked an engine like that at such a pressure if there were no stays. He never sent his engines out without indicators; the indicator would tell the amount of pressure even if the safety-valve was closed.

Mr. Hill.—What do you think is the cause of the calamity?

Witness.—Well, sir, I think it is owing to the absence of a proper number of stays.

By Mr. Briggs.—I never turn an engine out without them. I do not think an engine tested by hydraulic power to 80 ought to be worked at 50, or even 40, if the end of the boiler be not stayed. I should not think that a pressure of 45 would have lifted such a weight or thrown it such a distance. I have not the slightest doubt that there was sufficient water in the boiler at the time. I saw smoke issuing from the chimney about eleven o'clock, or perhaps half-past. It would take 50 minutes to get up the steam.

By a Juror.—An hour and a quarter would be amply sufficient to get up a good quantity of steam?

Witness.—It would, sir.

Alfred Eade, a blacksmith, at Buxsted, was at the Lewes sheep fair. I saw a steam engine in the fair, and went towards her. I saw a man with it, whose name I ascertained afterwards to be John Gold. A friend was with me, my brother-in-law (George Felwick). The engine appeared to be one which my son had described to me. Another man, Spencer Stephenson, came up to us, whilst we were looking at the engine. Stephenson spoke to Gold in my hearing, but I did not hear what Gold said. Soon after Stephenson spoke to him, and Gold turned the tap—at least some one did—and fixed a strap on the wheel; the strap with which they drive the chaff-cutter. The strap was too long; the engine required moving backwards. After this I saw some one at the wheels to lower the engine, which Stephenson and I assisted to run back. Gold then tried the safety-valve. The tap (the right-hand one) was turned before we moved the engine. Steam appeared to come out very sharp. After this he turned it back again. He seemed to have some difficulty in stopping it; it leaked, I do not know whether it was the upper or lower tap on the right-hand side; but I do know that it was not the tap of the water-gauge. After this I saw Gold put his hand on the safety-valve; when he did so no steam escaped. He appeared to lift the top, but did not move it. In about five minutes the explosion took place. I was forced back a yard two. At this time I had been standing about two yards from the engine, close to Stephenson; I was covered with steam.

By Mr. Briggs: Gold laid his hand upon the safety-valve, or part of it; he did not open it. I did not hear Gold say, "Stephenson, I have not half enough steam yet;" but I am deaf. I was not looking at Gold at the moment of the explosion. I did not see him take a bar in his hand to give a motion to the wheels. The engine was quite still just before the explosion. She had been quite still two or three minutes after it was attempted to put her level. Stephenson came up almost immediately after I was there. When Gold put his hand on the valve, the plug rose up, and he knocked it down with his hand.

Supt. Dawes was within 50 yards of the engine when the explosion took place. I saw her rise in the air, as far as I could judge, eight or ten feet; she turned three somersaults; she went over very quick. She fell within 18 yards of me. I did not observe she touched the ground the whole time. I doubt whether she rebounded at all. I saw the marks in the ground. Only one pen of wattles was between me and her. If she had turned over, the chimney must have touched the ground.

Mr John Chester Craven, locomotive engineer to the London and Brighton Railway Company: I recollect Mr. Cheale writing to me in November, 1858, saying that he had got a small engine, and wishing me to repair the fire-box and tubes; he also said that when done, we were to test it. Mr. Saddler did the work, repairing the inside fire-box and tubes, and returned it to Mr. Cheale. I believe that five stays were put in; but I don't know of my own knowledge in what state the engine was. Since the explosion I have seen the engine; this was on the Saturday after. Mr. Molineux, Mr. Saddler, and I came together—more for information than anything else. We examined the pieces at the police-station first; then we went to the field, and examined the boiler and the distance she had gone—I think 40 yards. We understood that she turned three somersaults in her progress, and we came to the conclusion that she must have had very great pressure inside to make her to do that. (Witness here gave an account of an engine exploding in another part of the country, in confirmation of Mr. Dawes' opinion—that she did not reach the ground in her progress; in the case referred to, the engine went through the roof of a building, and made two somersaults without touching the ground. Mr. Fairbairn came to the conclusion that the boiler must have had 400 lbs. pressure upon it). In the present case, in his opinion (and he had worked out the question) the pressure on the boiler must have been 145 lbs.; that is, supposing she had been made of Staffordshire iron, without any stays at all. I consider Staffordshire iron of inferior quality; they never make a boiler but of Yorkshire iron. We looked at the angle-iron on Saturday morning, and found that it had given way at the last place we should have expected; we should have expected it to have gone at the rivet holes. I should certainly never have built an engine of angle iron of

such a weak section. The boiler ought never to have been made of such iron. If I had been taken to look at the boiler before the explosion I should have thought the front plate well stayed. Now I see it is not. (Here witness pointed out what he meant, in reference to the system of staying, and illustrated his meaning with a coloured drawing.) Either Mr. Cheale or I might have thought the boiler was sufficiently stayed. In fact, I should have never dreamt but that she was well stayed, from the appearance of the rivets. (Witness also handed a drawing of the explosion to the jury, and then proceeded)—I should not consider transfer stays necessary for such a small fire-box, working at 45 lbs. pressure.

The Coroner: As you have made a statement in reference to the pressure, can you account for the excess of pressure?—It must have been 150. But there is something at which we have not got at yet in explosions; and I should recommend that no boiler be used without an indicator.

A jurymen: Who is the patentee?—There are two, one a Frenchman and the other a German.

The coroner: Supposing the safety valve had acted freely, could the explosion have taken place?—No, certainly not; steam must have escaped.

Would 32 lbs. weight of coal be sufficient to raise the pressure to 150 lbs.?—No; not without a lot of wood and shavings. You see that is a very small fire-box: it would not take much fuel to raise it to 40, and then still less in proportion afterwards. From 50 you could raise it to 80 in ten minutes; it then almost jumps up like lightning.

By the coroner: There are two ways in which a man could lock the valve—either by a wedge or by pressing upon it. The top of the valve is above the seating. It might get jammed, from its peculiar construction. It has not as much room round the casing as is usual. It would be liable to get choked with foreign matter. Supposing the valve to be set fast by foreign matter, on applying the spring balance steam might not escape.

Can you form any opinion as to whether it was stopped or not?—No.

Would the explosion have a tendency to loosen it?—No doubt it would.

Do you believe the valve to have been stopped at the time of the explosion?—It is impossible to say.

If the valve had not been stopped, how could there be a greater pressure than 45 lbs.?—There must have been a great pressure. I can't say; but there is something about explosions which we don't yet understand, in the gases.

By Mr. Briggs—There is nothing in the appearance of the valve to induce me to conclude that it was stuck fast at the time of the explosion.

Supposing steam to have been seen to escape within a quarter of an hour, might not the valve get fast, without any connivance on the part of the engineer?—It might.

If that were so, would that lead you to conclude that the explosion arose from some defect?—It might; or, the engineer might fasten the valve hastily, especially if it did not fit closely.

But that is not a well-constructed valve?—No; it is more like a pump.

Are you aware that steam produced from water, after it has parted with its oxygen, has a peculiar character?—Yes.

And there are explosions which you really can't explain?—There are.

Without some special pressure, the explosion could not have taken place?—It could not.

The Foreman: If the engineer had lifted up the safety valve five or ten minutes before the accident, and the steam had escaped freely, is it likely the accident would have occurred?—No, it would not.

If the engines had been thoroughly inspected and repaired, would not the defect have been discovered?—No: I can't discover any defect. The only thing I complain of is the weak angle-iron. She appears to be a strong boiler. I should not have minded working it at 50 lbs.

Would you have done more to the engine if Mr. Cheale had given you a general order?—Yes.

I suppose you would have put longitudinal stays?—Yes, if Mr. Cheale had wished it.

Have you the order which you refer to?—Yes.

(Order produced. It was to the effect that some of the tubes require fresh ferruling; that perhaps two new tubes

were required; and that the Company were to be kind enough to try the boiler with cold water).

Mr. I. Cheale: There is another letter.

Witness: O no, there was not.

Mr. Cheale: But look here—here is another letter, dated Nov. 3.

The Coroner: Wait a moment. What is the date of that first letter?

Witness: Nov. 1st.

Mr. Cheale: Yes; and this letter is dated Nov. 3, in which you say you are busy, and request us to say exactly what we require.

Witness: We got no other letter.

Mr. Cheale: Oh yes, you did, in answer to that letter of yours.

Witness: I saw no other letter. All I know is, that we then received the boiler and did the work which we were there required to do.

Mr. Cheale repeated his statement, that another letter had been sent.

The Foreman (to witness): Then you say you would have done more work if you had been ordered to thoroughly repair her?—No doubt of it.

Mr. Molineux, who was not examined, said he coincided with all that Mr. Craven had said.

Mr. C. Easton Amos examined: I have, for the last twelve years, been consulting engineer to the Royal Agricultural Society. I have to-day inspected the exploded engine, and the result of my examination as to the cause of the explosion is—First, a badly-constructed boiler; and, secondly, an excess of pressure. The want of stays would cause an injurious action upon the angle-iron, that would have a tendency to break it. The ill-construction of the boiler is shown by the want of stays. The angle-iron might have been hollow at the back, and it now presents the appearance. To satisfy myself that an excess of pressure did take place, I have made some calculations, and I come to the conclusion that the least pressure that would throw the engine forty yards would be 117lbs. to the square inch; that is supposing the engine made one bound, but if it made two or three somersaults, the force necessary to accomplish that must be in excess of the pressure of the 117lbs. This undue pressure, although I have no fact to prove it, I believe to have been caused by the safety-valve having become fast. Its general construction leads me to conclude that there was something not in its right place. I have nothing more to adduce, in respect to this question; but I have referred to the causes of explosion, which generally take place from the want of water in the boiler; in more instances, I believe, than take place from the explosion of hydrogen gas. When the boiler is partly filled with water, the rest is filled with atmospheric air. Then hydrogen may be generated; then an explosion may take place that no safety-valve could possibly indicate its results. It is like a quantity of gunpowder in the boiler, which would indicate no pressure. A second cause, when plates became heated from shortness of water, the steam is in a surcharged state, and may be at times asserting a feeble state of pressure, as shown by the safety-valve or indicator. A sudden movement, in case of fixed engines, such as starting it, will relieve a part of the pressure, and cause ebullition to take place, and the water particles coming into contact with surcharged steam, generates pressure so rapidly that a safety valve will not discharge it. One of these causes I thought was the cause in this case, and that the sudden letting down of the engine to its level might have covered partially a heated surface, and an excess of pressure thus generated. A careful examination of the boiler of this engine leads me to suppose that a shortness of water was not the cause of the explosion, because no indications appear on the crown of it, or any other part.

Mr. Amos then, in answer to various questions put by the Court, said he fully concurred in what Mr. Craven had said, and that the external appearance of the boiler of this engine would deceive any practical man—even himself. He also said he should have overlooked the defects in its construction, unless he had received general instructions to thoroughly examine it. He disagreed with testing an engine, or anything else, such as a crane, by making it sustain three times the

amount of pressure it is likely to be submitted to; and his reasons for disagreeing with such a test is, that the first application may so strain or weaken a part that, should a second application be made, it completes the destruction already begun.

Mr. Briggs then addressed the jury upon the evidence in behalf of the Messrs. Cheale, the proprietors of the engine, urging that there was nothing to indicate to them that the engine was unsafe.

The jury ultimately returned the following verdict:

"That the deaths of Reuben Lampert, John Gold, Jesse Upton, Albert Hilder, and Thomas Woodhall were occasioned by the explosion of a steam-engine boiler, on the Wallands, September 21, 1859, caused by the non-action of a safety-valve; and that the said engine, from subsequent examination, has been found to be of inferior quality and construction, and not properly repaired and examined before it was used. The jury feel it their duty to recommend that every portable steam-engine should have an indicating pressure-gauge; and that the present system of employing unskilled persons as engineers requires that all persons so employed should be properly examined and certificated; and that a periodical inspection of such engines should be made by competent persons."

IMPORTANT TO TENANT FARMERS.

At a Justice of Peace Court on Sept. 27—Provost Imrie presiding—a decision of considerable importance to tenant-farmers was delivered. A complaint under the statute 2 and 3 William IV., cap. 68, section 1, was heard at the instance of the Earl of Kinnonnell, who charged Mr. David Todd, tenant of the farm of Nether Kerr, with having, on the 1st September last, entered or been upon the complainant's lands of Nether Keir, in the parish of Gask, in search or pursuit of game. The defender pled not guilty, and his agent stated, as a preliminary objection, that it was incompetent to entertain any complaint against the defender for trespass on his own farm for any purpose whatever under the statute. The agent for the complainant contended that, though at one time it was held that neither the tenant nor the servants upon a farm could be convicted of trespass on said farm, the doctrine was now exploded, and a variety of cases had been decided by the Court of Justiciary that they could. He maintained, therefore, that a tenant killing game on his own farm without leave of the proprietor was a trespasser under the Act. To this it was replied, by the defender's agent, that there was no such variety of cases decided by the Court of Justiciary respecting the Trespass Act, as had been stated. There were only two—first the case of Smellie, 1st June, 1844, in which the court, by a narrow majority, decided that a tenant-farmer could not be prosecuted for trespassing on his own farm, under the statute 2 and 3 William IV. That decision had never been altered. The second was that of a servant for trespass on the grounds to which he was attached, and the court decided that he could be prosecuted. The agent craved his honour to sustain the objection. After a few remarks by the agent for the complainant as to there being no distinction between a tenant and a servant, it was agreed by both parties to have the opinion of Sheriff Barclay on the point. This, after a short delay, was procured, and the learned sheriff thought the objection of the defender's agent must be sustained, in respect of the decision of the Court of Justiciary relative to tenant-farmers trespassing on their own farms not having been altered. The presiding justice decided accordingly, and stated that the sheriff's opinion was in accordance with the views he himself entertained. The defender was then assuaged, and awarded expenses.—Northern Ensign.

THE ROYAL BUCKINGHAMSHIRE CENTRAL AGRICULTURAL ASSOCIATION.

MEETING AT AYLESBURY.

The last political vestige has been stripped from the Agricultural Association of Buckinghamshire. The county has now a central society, that unites alike all creeds and classes. Mr. Diaselli, to be sure, as the Conservative member, makes his speech at the dinner; but then Mr. Cavendish, for the Whigs, in turn duly follows him—*longo intervallo*, no doubt; but still either side has its chosen representative. Again, the Baron Rothschild offers one prize, and Mr. Bernard another; the working committee is as carefully balanced, and the very secretaryship as discreetly divided. The good policy of all this is at once apparent. The district had never previously known such a meeting as that on 4th October. In place of the poor, tame, spiritless affair we went out of our way last season to witness, there was a really excellent show, and one full of interest and encouragement for those chiefly concerned in its success. It had not only, as it should have, the general support of the shire itself, but the open premiums were as creditably contested. One thing is very evident, from the manifestation of this meeting—the shorthorns are gradually taking strong root hereabouts. The best bull on the ground, and a very good one indeed, is the property of Mr. Dodwell, a tenant-farmer on the confines of the county. He is called Prince of Paris, and was got by Booth's British Prince, dam by Bates' Duke of Glo'ster. It might be difficult to beat such a pedigree as that, while the fact itself shows the spirit with which the people of these parts are going into the business. Mr. Robinson, of Clifton, who bred the young bull, was one of the judges here; but, of course, he stood by, and allowed his two colleagues, Messrs. Druce and Franklin, to make the award over this class. Mr. Lawford, of Leighton Buzzard, came second amongst the bulls, and first with the cows, exhibiting a heifer of very high quality, and altogether refined and blood-like in her look. Still the decision was much discussed, many of his neighbours going for a great useful cow of Mr. Howland's, which was placed second. The latter, however, was some two or three years the older of the two, as well as in much higher condition. Mr. Hutt, from Watereaton, materially strengthened this division of the show with some samples from his herd, taking a series of first prizes with them, for a cow in calf, a two-year-old, and a yearling heifer. On the whole the exhibition of cattle was very good, but its merits were entirely restricted to the Shorthorns. How one bull of some other breed came to be distinguished, will perhaps ever remain a mystery.

The display of agricultural horses was also highly creditable; and, indeed, it was scarcely possible to

reconcile the excellence of this with the mediocrity of last year. Amongst many good mares and fillies a three-year-old of Mr. Seamons' stood pre-eminent. One of the judges in fact went so far as to say she was the best cart-mare in England. She is certainly very good, with a beautiful shoulder, good middle, and famous thighs and quarters. Seldom or ever was there a better one to stand behind. But her action was indifferent, although it must be admitted she was made up very fat and heavy. Of course a meeting in the renowned Aylesbury Vale would have been incomplete without a class of riding-horses; and a silver cup, given by Baron Meyer de Rothschild, brought together a very promising entry of yearlings. The prize colt, the property of Mr. E. Bennett, of Wards Hurst, is extraordinary for his size and development; and if he can only "go on" he will be a wonderful nag hereafter. He is by Middlesex, whose stock were in great force; and one of the Barons, who was present, was proportionately pleased to see them coming out so well.

The members of the Association were far better satisfied with the sheep show than the judges. There was nothing of any great character or distinctive quality, although the half-bred rams were declared by those who knew them best to be very fine. But by far the *finest* of all were a pen of ewes painted rouge et noir, to which the judges, with a poor eye to colour, had the cruelty to object. Considering the locality, the display of poultry was by no means imposing. The appropriately-named Mr. Fowler, however, helped it out with some extra entries, including good birds of several varieties. The butter was more up to the mark of what might have been expected; and the roots were remarkable for the mangolds, and what the judges did with them. They gave the prize to palpably the worst-grown collection of the whole lot; simply, as we were told, for the reason that they were by some pound or two the heaviest. If this be so, if such be the instructions, surely in future no judges can be required for such a purpose. Let the roots be only fairly topped, lopped, and weighed, and they will judge themselves.

The proceedings further included premiums for grain, and the usual rewards for agricultural labourers, shepherds, hedge-cutters, and drainers. There was also at a very convenient distance a ploughing match, in which a servant of Mr. Cook's, of Orendon, and one of Howard's implements were the winners, in a field of no less than forty-four starters. But, perhaps, the great feature of all this agenda was the last. There is no denying nor concealing the fact that the dinner and the speech and the *hip! hip!* have even yet a great deal to do with the Buckinghamshire Association. Nowhere else do the

farmers themselves so religiously observe this rite. In few other districts would they so readily repeat the ceremony. The memory of old times is still strong on them, and as three o'clock approaches they gradually desert the field for the table, intent on getting a good place, and hearing "what Mr. Disraeli has got to tell us this time." Although, why everybody, including the cows, horses, sheep, and pigs should run off at three precisely, may be a question hard to answer? As far as we could see, it was chiefly for the gratification of being wedged up in a narrow heated passage for some hour and a half or so, while dinner was getting "ready." Everybody else was willing long before. There was not a great man missing, and why three should be announced, and something past four meant, is an unaccountable waste of the public time utterly incomprehensible. Mr. Disraeli was once more the lion of the occasion, and he signalized the union of the two societies with an address commendable for the good taste and point with which he advocated the uses of such institutions. These may be apparent enough now, but it is only a few years since when if an abuse of power could have put down the agricultural associations of the kingdom it would certainly have done so. We subjoin a report of the right honourable gentleman's speech, the only one in reality that they would listen to. Nevertheless the Marquis of Chandos, as Chairman, Mr. Cavendish, Mr. Cother (for the Judges), and others, all spoke well to the business of the day. The company must have been tired out in waiting, for they soon became terribly unruly and vehement in their calls for "a song." We confess to sharing in this pastime, until a melancholy man had sung "Tom Moody" with such a pathos and expression as we never heard before, and then, in very fear that we might hear it again, we took our leave of an assembly that was clearly getting deeper into noise and harmony.

Mr. DISRAELI, in reply for the county members, said—I may congratulate you, I think, without using any extravagant terms, on the general proceedings of the day. I think they are highly satisfactory. I think they indicate progress, and the path we wish to walk in, and that the duties we are anxious to fulfil to stimulate industry, to further agricultural science, and to reward merit, both in the county of Buckingham and amongst the community with whom we live, have been carried out to a considerable extent. None can deny, at any rate, that great and important progress has been made. Gentlemen, I remember the time, and many of you remember it also, when it was necessary to defend meetings of this character. Now, having been myself one of the earliest members of the original society, which has expanded and largely increased, both in members and importance, I can, I say, recal the time when it was necessary, on all occasions, to vindicate assemblies of this kind and institutions of this character. But the best answer to these remarks now is the fact that for the twenty-five years and more that have elapsed since their foundation and introduction in this country, we find them being literally sown broadcast over the length and breadth of the land, and flourishing in every part of it. Men of all parties, opinions, and sentiments are combined together to carry into effect the object of these associations. We find also an unani-

mous agreement amongst all those who have a due acquaintance with rural life as to the beneficial effects which attend the operations of societies of this description. I know there are many points open to criticism, and I wish to know what is there in this world that is not open to criticism? But if there were no critics in the world, society would soon be at a stand-still. Gentlemen, we are associated to animate skill, to elevate character, to encourage enterprise, and to reward merit. These were always considered the means by which communities are taught to flourish, and by which mankind is rendered happier. But if there had been only critics in this world, perhaps none of these means would have been had recourse to, none of these ends would have been gained; for critics never animate skill, critics never elevate character, critics never encourage enterprise, and critics never reward merit. It is peculiarly encouraging to us to-day when we remember the circumstances under which we meet. There were in this country rival societies, and although I for one feel the great importance of concentrated efforts, I must at the same time acknowledge that though there have been rival societies, great advantages may have arisen from that circumstance, because a certain degree of emulation is necessary to success. Although myself one of the oldest members of the Royal Bucks Agricultural Association, and although I think its exertions were highly beneficial to the county, yet it was subject to very unjust remarks, and its conduct and proceedings were often misrepresented. But I know very well that it is impossible that any body of men can conduct affairs without their being open to much improvement; and I, for one, never looked with jealousy or hostility upon that society which was once our rival, but which is now an equal partner and confederate with this association. There were many deficiencies which it was necessary to supply in its original constitution, and omissions to be filled up in course of time—many defects in it, to be remedied in the progress of improvement. These deficiencies, I am glad to say, have been to a great extent supplied by this society; and I believe it is for the advantage of the county that the Royal Buckinghamshire Agricultural Association and the Central Society are now united. By this union both will confer peculiar advantages. They will work well together for the interest of agriculture, not only for this county, but for the community at large. I think the show to-day may be looked on by all of us with very great satisfaction. True, it might have been better. I believe that in future it will be better, excellent though it has been to-day; for what is the use of this or any other society, unless its members and supporters are animated by the spirit of progress, and unless they feel a determination at every meeting to excel the efforts of the last? And allow me to remind you, when I talk of exhibitions of an agricultural character in this country, that the county of Buckingham has already obtained considerable reputation. It is now universally admitted that England takes the lead amongst countries in the cultivation of the soil. There are many other points in which, as Englishmen, we have been in the habit of asserting our superiority; and I need not enter now into a controversy whether this assumption of superiority be true or not. I know it has been questioned by eminent continental nations and critics in several particulars; but this I think I may say—that, on the point of agriculture, never! And for this simple reason: the test of the superiority of agriculture is the amount you produce from the soil of the country; and that country which produces the most from its soil is held to be the foremost and most skillful in agriculture. This, then, has been the condi-

tion and position of England for a long series of years. For a long time she has been famous for the cultivation of the soil and the progress she continues to make in this respect. It has been the boast of the county of Buckingham that it has occupied no mean position; and I am not aware, speaking without extravagant feeling, and with a due sense of the impartiality which becomes considerations of this kind—I am not aware, I say, that Buckinghamshire is in any way inferior to, or that it is undeserving, the position it has hitherto relatively occupied. If you go to the extreme south of the county, I can point to one of the most skilful agriculturists in England—one whose fields are cultivated in the most masterly manner. I say this on the report of one who is no friend to our system, and who has no connexion with our county. And if you advance to that district in which I have the honour and happiness to live, the Chilterns, you will find that it is a fact that, great as has been the progress made in many parts of England as regards the cultivation of the soil, there is no part in which greater progress has been made than in the stock farms of the Chiltern-hills. Whether you look at the broad lands of the farmer, or to the patches surrounding the cottages of the labourer, to their root crops, or to the land which by enclosure has been brought into cultivation, I say that there is no part of England in which, during the last quarter of a century, all that belongs to farming can be said to have shown greater progress. Nor in any part of England can you find individual examples set by landlords higher than those set by the landlords who own the soil in the district of the Chiltern-hills. Again, if you come into the favoured vale in which I have now the honour and pleasure of meeting you, all I need say is, that there is no portion of it not only of which you need be in the least ashamed, but which might be placed in competition with any part of the United Kingdom. We have still the far-famed Creslow-field, the pride of England indeed, to say nothing of Buckinghamshire, as being per-

haps the largest and richest piece of pasture in the world. Having this in the extreme south, then in the Chilterns we find it is truly the queen of pasture land. Now, what has happened in the north, that portion which some years ago used to be spoken of in terms of comparative commiseration? You will find that you have done much by extensive drainage; and that excellent management is still going on at a considerable pace. But you have done more. In that part of Buckinghamshire you will find a farmer who has applied steam power both practically and extensively in the cultivation of the soil. Whilst some men were writing theoretical essays on agricultural proceedings, and others inventing machines which could never be brought into use, a Buckinghamshire farmer, Mr. Smith of Woolston, has cut, as it were, the Gordian knot, and has effected that which philosophers have only dreamt of, and which but few believed would ever be brought into practice. The county that has done all this, looking from its extreme north to extreme south, I say need not be ashamed to hold up its head by the side of any agricultural county in the kingdom. I say even that it takes the lead in the cultivation of the soil, and produces the greatest amount of food from that soil. I say, too, that Buckinghamshire has at any rate produced its due share towards the aggregate amount of agricultural skill and labour, and I feel that we should consider it a pride to belong to such a community. The meeting and the exhibition of to-day in connection with this association should, I think, be viewed as a proof of the success which has followed its efforts in the cause of agricultural advancement; and, judging from what I have seen, I hold that the society has well maintained its credit. Mind, I am not here with honeyed words to pretend there is no room for improvement. On the contrary, I feel that improvement is the necessary condition of pre-eminence, and that it is only by your continued exertions that you can continue to hold the distinguished position which you at present occupy (loud cheers).

THE ROYAL VETERINARY COLLEGE.

OPENING OF THE SESSION.

The holidays are nearly up. The very longest vacations are fast drawing to a close. The laziest of the old boys are taking their last sail, or having just another beat or so through the covers. Saving only for the upper ten thousand, who graduate from one sport and pastime to another, the office, the study, or the schools await the majority of us. Term is going to begin, or the session to open, or the class to re-assemble; and with renewed heart and strength we face the bustle and business of London once more. To many, custom has made this easy enough. We take to the collar again as sedately as the old pony who sees John approaching him with the sieve in one hand and the bridle in the other. We know it is of little use trying to shirk the yoke, but let us trust that sounding measure may at least hold a handful or two of good oats. So goes the journey through life of the old stager. With the young ones, on the contrary, the half-broken high-spirited colts, there are all kinds of hopes and fears and excitements to calm or subdue. It is a difficult task, often enough, to get

them to settle quietly down to their work, and the fine hand and even temper of the artist are needed, to make them start fair and pull well together. *St!* gently there—don't fret, my lad! Let go his head, horse-keeper. All right, eh? That will do. Leave 'em alone—and now we're off!

Our illustration has at least the merit of being in good time and place. The application is left to those who, perhaps, above all others should understand it. The Session has opened, the vacation is over, and the class re-assembled. The colts are brought up again from grass, and are once more in harness. The Professor has already got hold of them—with a powerful arm, but a light hand, and a double thong, meant rather to soothe an awkward-tempered one than to hit him hard outright. On Monday, Oct. 3, being some weeks earlier than usual, and contemporary with that of the other medical schools, the opening of the Session took place at the Royal Veterinary College. Professor Simonds was selected to deliver the inaugural address on this occasion. How he has acquitted himself our

readers will be enabled to judge from a report of his oration, which will be found in our magazine of this month. We have given this at great length, the more so as it is the first appearance of the paper in print. We confess to have read it ourselves with more than usual satisfaction. In its style and matter it implies a higher tone and position than we feared that of late some of the profession had been taking. The speech from first to last is that of a well-educated man to his fellows, and evidently prepared with all confidence that his audience will appreciate and sympathize with what he says. There may be "roughs" still in our medical institutions of all kinds: it would appear almost a necessity that it should be so. If, however, anything would tend to raise a young man in the social scale, to advance him not only in his vocation, but to refine his feelings and improve his conduct, it would be such an address as that Professor Simonds spoke to the pupils of the Veterinary College. It honours alike him who gave it and those who heard it; for it fixes a high standard of study and merit, that it will be a dereliction or even a disgrace not to observe. So far, at any rate, the Professor has done his duty: let those he has called upon now do theirs.

Even beyond the recommendations of this essay as a scholastic thesis or class paper, it has many claims on the more general reader, and unquestionably some on our own. A very noticeable feature, indeed, is the increased attention which the Veterinary art appears to be giving to the animals of Agriculture. There is no question but that a comparatively few years since, the one science was rather above the other. The duly qualified, passed, and certificated veterinary surgeon was simply a doctor of horses. These were his study almost as strictly as the human frame is that of the student of St. George's or of Guy's. In his own somewhat contemptuous phrase, he was "no cow doctor," and you had perhaps better send, as you have done, for the old village farrier. Of course there was some cause for this indifference. In the earlier days of the College there was scarcely any field whatever for such operation, and a veterinarian who thought to live by cattle, sheep, and pigs, would scarcely promise to make much of it. The horse, the well-bred horse above all others, was his patient, and the centre of a good hunting county would sound far better for a practice than "ever-so-many" herds of cows or flocks of ewes. In fact, the farmer was not ready for the coming man. Let his old favourite "Patty" or "Bright Eyes" be ever so bad, we doubt whether a drink from the blacksmith would not have been the most he would have thought of. And if, even after all that, she did die, it was of course to the old tune, that "it couldn't be helped."

But times are changed since then. There is many a beast worth more hundreds than a horse, and some herds of cattle far more than a stud of hunters. Nay, it is no use concealing the fact that they are quite as liable to disease, and quite as often in want of a doctor. Now that we breed in-and-in, and feed high, things are apt to be delicate. People even do say that many a prize animal is prepared, or got into condition,

much on the plan our forefathers did their nags in the olden time—put three months upon grass, three upon physic, and the other six upon good stuff. There is plenty of scope here, then, for the member of the Veterinary College; for valuable stock are no longer in the hands of one or two enthusiasts like Bates or the Quartleys. They are gradually spreading throughout the country, and every district will soon require its medical man, as well up in the disorders of thorough-bred cattle as in those of thorough-bred horses. With good showing, then, would Professor Simonds not have the education of the student "cribbed, cabined, and confined" to the standard of bygone days. He dwells, the rather, with continual emphasis, on the many fresh openings now offering, and the other varieties of disease that are to be met with in other kinds of stock. In a word, a man must qualify himself as a *general* practitioner, and then can he wish for a better introduction than that of veterinary inspector to some agricultural association? There is not a county by this but has such an appointment at its disposal, while very many have two or three such institutions in action. The Professor is singularly well situated to press this point home to his auditors. Beyond a doubt the leading men have, as a rule, been above what he speaks to. In his own person, however, he offers us a striking example to the contrary. He is called upon, in turn, to deliver this address as one of the heads of the College, at the same time that his name is more particularly identified with the ills of cattle and pigs; while he strengthens all he advances on the authority of another office he holds, that of Veterinary Surgeon to the Royal Agricultural Society of England.

It has recently been a matter of some discussion whether the veterinary art has really made all that progress it should have done. In Scotland an effort is now being tried to improve upon the practice by the aid of a little competition. One school has been set up against another, and a new set of teachers and masters have volunteered to put themselves in comparison with those already in high places. Of course little harm can come of this. On the contrary, some good is already perceptible in the quality and force of certain articles contributed to a new journal devoted to the profession. In England we have no such rivalry, neither do we see that it is much wanted. "The Veterinarian," consequently, continues to be the recognized organ of the student and the practitioner; while to the former, Professor Simonds recommends it both as a work to read and to write for. We have only to hope that such a suggestion may avail as much as it is desired; for this is by far the weakest place the opposing critic could see through. It is difficult, in fact, to reconcile the masterly productions of the Professors, the strength and purity of their language, the excellence of their precepts, and the extent and variety of their knowledge, as evinced in the annual inaugural addresses, with the commonplace record of cases, deaths, appointments, and such material of which the periodical of the profession is in a measure composed. One gathers a far higher opinion of the faculty from what we hear in the

lecture-room than from what we read in the Journal. It is a kind of complacent birthright we Englishmen enjoy, that no one should be able to do better than ourselves. Above all, we must be well represented; and it will never do to suffer the schools of Edinburgh or Paris even to talk better of what we may practise so well. The one grand moral of Professor Simonds' address is to give generally a higher tone to the study of the veterinary art; and even reading and *writing* must not be neglected.

INAUGURAL ADDRESS,

BY PROFESSOR SIMONDS.

The Medical Session of the Royal Veterinary College commenced on the 3rd October, being somewhat earlier than in former years. It has long been customary for the lectures at the other medical schools of the metropolis to begin on the 1st of October, or as near thereto as possible; and the Royal Veterinary College has at length adopted the same plan. Hitherto some of the most important instruction of a practical character has been crowded into too limited space of time at the close of the term. The inaugural address was delivered by Professor Simonds; and among those present to hear it, there were, in addition to the Professors, the President of the Royal College of Veterinary Surgeons, the Principal Veterinary Surgeon of the Army, and several members of the Court of Examiners, with the leading practitioners both of town and country, and many other gentlemen interested in the progress of the science. So large an assemblage has perhaps never before been seen within the college walls; and not only was the theatre crowded to excess, but even all approaches to it, as well as the adjoining museum.

By our assembling here to-day we are forcibly reminded that another year of life's existence has passed into the bosom of eternity. The wheel of time has again completed its annual rotation, and the hand on the dial plate indicates that the period has arrived when we are to resume the active duties of our station, and confront the obstacles that oppose the progress of our profession. The session we this day inaugurate will ere long be numbered with the past, and, like its antecedents, carry with it, we fear, too many evidences of good intentions being unperformed, and right resolves being unfulfilled. Let us, however, each in our sphere, endeavour to be faithful in every trust, and diligent in the performance of every duty, so that when we look back upon our course we may see few things which ought to have been done, and fewer still which ought not to have been done.

For the first time in the history of this Institution we commence our scholastic instructions simultaneously with the medical schools, and this day finds crowds of anxious enquirers after knowledge thronging the benches of the lecture rooms of this great metropolis, listening to the eloquence of philosophy, or the more sedate counsel of experience. Happily we can say that not only are our own benches not vacated, but on the contrary being filled to repletion, we have thereby a firm assurance that a deep interest also pervades the community on the progress of the science we profess. Besides veterans in the practice of our art, and aspirants to its honours, I see around me many kind and personal friends as well as others,

and I desire to thank one and all, in my own name and in the name of my colleagues, for the honour they have done us as teachers in this institution by their attendance here to-day. The apathy which we are sometimes inclined to believe has an existence among the general public in all which relates to our calling, is thus in a great measure disproved. Such kindness cannot, therefore, fail to stimulate our exertions, and to support us in the trying difficulties which are of necessity associated with our responsibilities, and as such it has our warmest thanks.

This earlier commencement of our labours has in it many advantages, and especially will it allow of a fuller elucidation of the details of pathology at the close of the session, besides affording increased facilities or deeper anatomical research; things of the first import for the success of the students.

As a profession we must be content to follow in the wake of human medicine, "*Ars veterinaria post medicinam secundam*," was the remark of an ancient writer, whose works, however, show how deeply he was impressed with the importance of this art, and how strenuously he laboured for its advancement. Shall it be said that we are less ardent in the cause of science, and less diligent in the use of means to elevate the veterinary profession, than was Vegetius, of whom I speak, and who lived fifteen centuries ago? Surely not, but rather let us give proof to the world, that if our art in its practical utility to the requirements of man stands second to human medicine, that as an abstract science it is fully equal and as such deserves a like support.

On occasions like the present, custom has wisely ordered that the chief objects of the lecturer shall be to bring before the pupils an outline of their studies, show them the facilities which exist for the obtainment of information, and offer them some words of advice and friendly counsel; and as it is not my intention to depart very widely from this course, so I must ask the kind indulgence of the senior and non-professional portion of my audience to bear with me in my exposition. It cannot fail to be remarked that I have laid stress on the science of veterinary medicine, rather than on its practice. Science may be regarded as "knowledge reduced to a system." In its extended sense it has sometimes been defined as "man's conception of God's universe," and as such its possessor is enabled to successfully grapple with difficulties, and to surmount obstacles to which others must succumb. The scientific veterinary surgeon is as superior to the man of mere routine and practice, as he is who studies the starry firmament, with a knowledge of the movements of those heavenly orbs, compared with him who looks upon them only as a thing which is. By this remark I am forcibly reminded of the eloquent address which has just been delivered at the meeting of the "BRITISH ASSOCIATION," by His Royal Highness the Prince Consort. Speaking of science, the Prince observes:

"To me science, in its most general and comprehensive acceptation, means the knowledge of what I know, the consciousness of human knowledge. Hence to know is the object of all science; and all special knowledge, if brought to our consciousness in its separate distinctness from, and yet in its recognized relation to the totality of our knowledge, is scientific knowledge. We require, then, for science—that is to say, for the acquisition of scientific knowledge—those two activities of our mind which are necessary for the acquisition of any knowledge—analysis and synthesis: the first, to dissect and reduce into its component parts the object to be investigated, and to render an accurate account to ourselves of the nature and qualities of these parts by observation; the second, to recombine the observed and understood parts into a unity in our consciousness, exactly answering to the object of our investigation. The labours of the man of science are therefore at once the most humble and the loftiest which man can undertake. He only does what every little child does from its first awakening into life, and must do every moment of its existence; and yet he aims at the gradual approximation to Divine truth itself. If, then, there exists no difference between the work of the man of science and that of the merest

child, what constitutes the distinction? Merely the conscious self-determination. The child observes what accident brings before it, and unconsciously forms its notion of it; the so-called practical man observes what his special work forces upon him, and he forms his notions upon it with reference to this particular work. The man of science observes what he intends to observe, and knows why he intends it. The value which the peculiar object has in his eyes is not determined by accident, nor by an external cause, such as the mere connexion with work to be performed, but by the place which he knows this object to hold in the general universe of knowledge by the relation which it bears to other parts of that general knowledge. To arrange and classify that universe of knowledge becomes, therefore, the first, and perhaps the most important, object and duty of science. It is only when brought into a system, by separating the incongruous, and combining those elements in which we have been enabled to discover the internal connexion which the Almighty has implanted in them, that we can hope to grapple with the boundlessness of His creation, and with the laws which govern both mind and matter."

It would be folly for me to attempt to add, by any feeble words of mine, to this eloquent definition of *general science*, or to the means by which it is to be acquired; but ours is a *particular science*, and as such it requires some especial elucidation at my hands. Until the foundation of this institution, the science of veterinary medicine remained a hidden treasure, at least in this country; but on the continent, diligent explorers of this mine of wealth were already at work. As a matter of history, it is well known that as early as 1761, France set Europe the notable example of improving the condition of the veterinary art, by founding a school at Lyons. This was soon followed by the establishment of similar institutions at Alfort, near Paris, and by others in the leading capitals of Europe. It is not, however, my intention to go into the particulars of the founding of these institutions, nor even of our own, except to remind my hearers that, as a profession, we yet fall short of the allotted period of the life of man, being scarcely seventy years of age, and consequently that the advancement of the science of veterinary medicine has to be measured by the fewness rather than by the number of its years of existence. The establishment of the college found ignorance and self-sufficiency, the sanitary guardians of the thousands upon thousands of England's domesticated animals, and even now it cannot be said that their hold is entirely destroyed. Nor is this less true of the continental states. Circumstances have required that I should become familiar with veterinary medicine as practised in a considerable portion of Europe, and suffice to say, that everywhere I have found the worst kind of empiricism to prevail. The quack, in all places and under all circumstances, builds his claim on the same foundation—*great practice and experience, and the possession of invaluable receipts*. He repudiates "knowledge reduced to a system," and brands its possessor as a visionary theorist. Thus, gentlemen, you see the battle of life which lies before you, for these evils have still to be surmounted. Success depends entirely upon yourselves, and it will be in proportion as you have "the knowledge of what you know." Do not, however, misunderstand me; it is not that, as veterinary surgeons, you are to be purely scientific men, but scientific practitioners. The useful must be blended with the ornamental. The very nature of our calling requires that we should be eminently practical in all we do. You will frequently be judged of by the amount of practical tact you show in the management of animals; but confidence in your opinion and in your treatment of disease will nevertheless be in proportion to the amount of scientific knowledge you prove yourselves to be in possession of.

I come now to the *nature and extent of your studies*. It is the "freshmen" who require principally to be told that these are manifold; that they embrace no less than an investigation of the structure of each domesticated animal, the uses of the several parts of the organism, the changes to which these are exposed by diverted action, the means by which this is to be

subdued, the history of the agents employed, together with their composition, properties, effects, legitimate doses, &c. Besides these, all of you will have to make yourselves masters of the principles of surgery, and the method of performing operations, as well as with the several collateral branches of science, hereafter to be alluded to, and which have a greater or less bearing on the principal object of your study.

Anatomy is truly said to form the basis of the fabric which has to be reared. Without this foundation to rest upon, the whole superstructure of medical knowledge is in danger of falling to pieces. It is impossible to speak too forcibly of the importance of anatomy, and of the necessity which exists for you to devote a considerable portion of your time to its investigation. It is in the dissecting-room alone where such knowledge can be rightly obtained, and the facilities which are afforded in this respect to the veterinary student contrast strongly with the difficulties which beset the progress of the student of human medicine. Our subjects are comparatively of trifling value, and easily obtained, and can be brought to the table with their organism unchanged by the inroads of disease or by natural death. These privileges are, however, not to be abused. No justification can be found for the wanton or unnecessary taking away of life. Ever should it be remembered that life in whatever form it is met with, whether in lordly man, the highest of earth's created beings, or the tiniest monad that sports in a drop of water as in a boundless ocean, is the gift of God, and as such deserves our reverence and praise, as also our protection. True it is, that in taking the life of an animal we take but animal-life, and that no soul is thereby hurried into the presence of Deity; still, for the reasons before advanced, unnecessary sacrifice must not be made. I am induced to dwell on this, because I have seen great waste in the dissecting-room, and many a subject removed while yet useful for important purposes. Another reason also remains to be stated, namely, that sufficient care is frequently not exercised in the dissections; parts are literally cut up and destroyed instead of being properly separated, the one from the other, for further study, and when inquiry has been instituted into this, the cause assigned has been the readiness with which subjects can be procured. We look for improvement in respect to these things, and hope to find, throughout the present session, that both old and new pupils will vie with each other in the neatness of their dissections, and in the amount of knowledge which is to be obtained from the parts they already possess.

Information, such as can only be acquired in the dissecting-room, will also demand silence and decorum to be strictly maintained, notwithstanding the observance of these cannot be enforced on the same high principle as in the schools of human anatomy. If we cannot say that a reverential awe ought to be inspired by the thought that we are walking among the dead, or in the eloquent language of Bowman remind the student, "that the dead body on which he operates had once been tenanted by the soul of man, that in all probability the Divine Spirit had once deigned his presence there, and, finally, that its scattered elements are destined to be one day reconstituted, and in a changed and purified state of incorruption to resume their mysterious but essential part in the life of an immortal being," surely we can require that the veterinary student shall not disgrace himself by practical jokes and levity of manner when engaged in analogous investigations.

Anatomy, by common consent, is divided into two branches—*general and descriptive*. The former reveals the structure and physical nature of the various tissues of each organ of the body, whether it be bone, muscle, nerve, tendon, or by whatever name it is called; while the latter shows the size, form,

and position of every part, and the relative connexion each has with the other. Organisation is thus made plain to the senses. The wholeframe is seen to be fitly and aptly put together, everywhere giving evidence of the wisdom and design of the great Creator, in whom we live, and move, and have our being.

The most profound anatomist, however, as such, would know but little of the uses of the several component parts of the body. The structure of the liver does not reveal to him that it is destined to form bile, any more than that of the kidney does that it has to secrete urine. The science which unfolds these mysteries is physiology, and it therefore constitutes an important element of your studies. Physiology has to do with a *living organism*, and to a great extent it must therefore be learned from the writings of our best authors, conjoined with the expositions of your teachers. It is perhaps the most inviting of all sciences; for, while some of its laws are fixed and certain and easy of comprehension, others allow of the greatest range of the human intellect for their solution. General or minute anatomy, physiology, and organic chemistry are so intimately united and blended together, that the one cannot be thoroughly investigated without the aid of the other.

So much of what we may be permitted to call commonplace physiology, it is right that you should become *early* acquainted with; but you must be careful to avoid the study of the abstruse points of the science until you have made considerable progress in anatomy and general chemistry. For example, all should know at once that it is the office of the stomach to digest the food—of the liver to form the bile—of the heart and vessels to circulate the blood—of the lungs to support the breathing—and indeed be familiar with the ordinary functions of every portion of the frame: but the way in which these offices are performed, the part that life or organic chemistry takes in their production, must be left for future study.

Sufficient has already been said to show to you that chemistry is indispensable as another of the sciences for your investigation. Nothing has done so much for the improvement of the modern veterinary surgeon as his knowledge of chemistry. Without it he was yet ignorant of many of the functions of the body in health—of the changes wrought by disease—of the means to satisfy himself that death arose from natural causes—of the composition, properties, and even doses of the agents he employed; in fine, deprived of this knowledge, he could not be considered either a profound physiologist or a safe and sure pathologist. A study of this kind and importance will of necessity make a great demand on your time; but if this is rightly economised, it need not to interfere with your other duties. The truths of chemistry are so captivating, its phenomena so striking and beautiful, and its results so important, that the danger often is that pupils will be eager to dive into its subtleties before they are proficient in its elements. You require, then, the same caution here as has just been given with reference to your study of physiology.

Connected with chemistry, as collateral branches, are *materia medica* and therapeutics—sciences which treat of the agents and the manner of employing them in the treatment of disease—and which in due course must also have their proper share of attention.

Botany, although not yet taught in this Institution, is no less an essential part of the education of the veterinary surgeon. The views of my colleagues and myself have been so frequently expressed with regard to this subject, and enforced by such a multiplicity of arguments, that it has become almost a work of supererogation to again refer to it. Professor Headland has truly observed that "the importance of this science,

as an addition to the curriculum of *general education*, is at present very universally admitted. Even for a man who is altogether uninterested in the pursuit of medicine, it is certainly not a thing to be proud of, that, while well informed in other points, he should be totally unacquainted with the names, and as totally ignorant of the properties of the common herbs that flourish in our fields and hedgerows. For the tourist, the emigrant, the agriculturist, the country gentleman, some knowledge of botany may be said to be almost indispensable; whereas, to the student of medicine an acquaintance with this science is of still more immediate importance. It teaches him to distinguish by their outward characters the vegetable products that constitute so large a portion of our *materia medica*; it enables him to select with certainty from among our native plants those which are poisonous, those which are medicinal, and those which are useful as food." The want of instruction on this science within these walls ought not, however, to deter you from its pursuit; for, placed, as most of you are, in the rural districts, during several of the summer months, you can do much to supply this defect. With a book or two on the elements of botany, and a careful selection of plants as they successively put forth their flowers, you will soon master the rudiments of the science. Remember that in every science there is an alphabet to be learned, and to be learned thoroughly before any advance can be made. This once acquired, further reading and research will soon perfect that which was so well begun. There is no kind of study which you could pursue in the intervals between the courses of lectures delivered here, which is more exhilarating and healthful; while, as has been truly said, "the objects themselves are among the most beautiful in creation." Do not fall into the too common error of supposing that your teachers are alone responsible for your professional acquirements. You must be fellow-workers with them, or you cannot expect to reap the fruits of the harvest. A knowledge of the *necessity* of a thing on our parts is a totally different matter from a knowledge of the thing *itself*; and hence, as teachers, we one and all feel our deficiency with respect to the science of botany to be too great to presume to offer instructions thereon. An alteration of the curriculum of study can alone effect this; and such necessarily involves other changes, some of which are not certainly desirable, at least in the present state of our institution.

I pass on to speak of pathology, the science which embraces the nature, causes, and effects of disease, and to which it may be said all the other branches of medicine converge. In studying pathology we note the phenomena that the functions of the body present when diverted from their usual course by the intervention of disturbing causes, and examine the alterations of structure which accompany such deviations from the correct standard. From the ever-varying causes of disease, pathology may be said to be constantly being learned, but never fully acquired; and hence the value of experience, which time alone can give, in deciding on the nature of doubtful or difficult cases. The steps by which you are to begin the ascent to this temple of fame are securely laid, and none other will serve to conduct you thither. The sciences which have been named are indispensable aids for you to become veterinary surgeons. It is true that in studying them you are not to be anatomists, physiologists, or chemists simply as such; but to be what you desire to be, you must first be all these in degree. "Without a scientific knowledge of the principles and laws which preside over the natural operations of the living body, you cannot be said to understand, even vaguely, the nature of the derangements of disease; and without a scientific insight into morbid conditions it will be impossible to adapt your treatment skil-

fully to the varieties which they manifest, or to be other than the slaves of empirical rules, blindly applying the same remedies under circumstances wholly different, and constantly at a loss when new phenomena unexpectedly present themselves.* You need scarcely be told that your success in after-life will mainly depend on the practical results that arise from your skill in the treatment of disease. Reason, as one of the mental faculties, should guide your proceedings; for all these rightly cultivated tend to perfection. It is instinct alone which never changes. Birds build their nests and bees their cells now, as they did when they were created; but reason, at however great disadvantage from the influence of custom and prejudice, is a principle of change, and if you appeal with confidence to it, your appeal must ultimately succeed. Next to the daily watching of cases of disease, noting the progress, change, or alleviation of the symptoms, nothing will tend so much to the advancement of your knowledge of pathology as the making of *post mortem* examinations. This, which is designated pathological anatomy, unveils things which had been shrouded in mystery, and brings to the clear light of vision that which had previously been only obscurely discerned. Pathological anatomy, in reality, holds in relation to disease the same connection as normal anatomy does to the understanding of the structure of the body. As veterinary surgeons, we here stand on vantage ground. Few objections are ever made to our autopsies; nay, they are not unfrequently insisted upon to test the value of the diagnosis; for there are no kind friends to consult, whose grief is poignant at the loss they have sustained, nor are our humane feelings wounded by the surgeon's knife laying bare the internal organs of the body.

The knowledge thus gained becomes indelibly fixed upon the mind; and the more it is reflected upon, in relation to the symptoms, the more valuable it becomes. As a future guide and counsellor, it is often of the utmost worth; for it will guard you in great measure against the temptation of expressing too freely an opinion at first sight of the nature of a disease. *Post mortem* examinations are by some too much neglected, being instituted only in rare and unusual cases. This is an error akin to that of watching such cases only, and disregarding the information which is to be obtained from the more common forms of disease. "Every case indeed, if well observed, will yield instruction—this for its rarity, that for its frequency."

From these remarks it will be inferred that pathology, to some extent, admits of a division into two parts—the one including special or particular affections, the other general or common ones.

Special affections are not, however, to be viewed altogether as rareties. On the contrary, they are frequently the most common, as well as the widest-spread, maladies with which we have to deal. The rapidity of their attack, and the extent of their existence, often excite our liveliest attention, while the fatality that marks their progress causes our deepest anxiety. This is especially the case both with epizootic and enzootic affections—a fact which reminds me of the propriety of saying a few words upon some of the diseases which have prevailed among our domesticated animals during the past year.

The influence of a continuous hot or cold temperature, a moist or dry atmosphere, or a very variable condition of the weather, in the production of prevailing diseases, is a circumstance far too lightly thought of by many practitioners. Not only in some seasons, but likewise at particular periods of the year, certain diseases are so frequently occurring as

to call forth remarks even from the least observant. That many of the maladies of domesticated animals are dependent on the locality and soil they inhabit, as well as on the quantity and quality of their provender, all practitioners are ready to admit; but the immediate, as well as the ultimate, influence of the weather, in mitigating or increasing the effects of these local causes, is often too little regarded by them.

For upwards of a year the fall of rain throughout the greater part of England has been remarkably small; so much so, that many agriculturists have experienced the greatest difficulty in procuring a sufficiency of water, both last summer and this, for their cattle, while that which was obtained was often of the worst kind possible for the maintenance of health, being charged with vegetable matters in a state of decay. From the same cause, also, the pasture lands at the latter part of the summer of last year were so scorched, that they yielded a very insufficient supply of herbage. The immediate result of this state of things was a great fall in the condition of cattle and sheep, which ill-adapted them to withstand the privations and chilling blasts of winter; and the ultimate result the loss of hundreds of sheep during the winter, although the weather remained dry, and as such, according to ordinary experience, well suited for these animals. *Post mortem* examinations showed an emaciated state of the body, accompanied with local congestions, particularly of the lungs, as the direct cause of death.

Next to sheep, young cattle suffered the most, the major part dying from diarrhoea, running on to dysentery. It is also worthy of note that in numerous cases, where persons by too generous feeding with oilcake, mangel-wurzel, &c., attempted quickly to restore the loss of condition of their young stock, the animals fell a sacrifice to attacks of hæmato-sepsis, commonly called black quarter, or quarter garget, from a gangrenous condition of a considerable part of the body, due to a septic state of the blood.

The late summer also has been remarkable both for its heat and dryness. The *Observer* newspaper of the third week in July, alluding to the subject, says that—

"For the last forty-six years it has not been so hot in the metropolis as during the last fortnight. All at once we seem to have passed into a tropical climate. For two or three days there has been experienced a temperature equal to that of India. Several persons have been prostrated with sun-stroke, and perished during the week, and among others two poor little children, left in a perambulator by a careless nurse-girl in the sun. To follow the ordinary avocations of life has been a most weary and irksome task; men, women, and children seemed almost to gasp for breath. In the House of Commons, especially in the committee-rooms, which face the river, the temperature was something frightful, as every crevice through which air could be admitted was stopped up, in order to exclude the pestilential odour of the Thames. In one of the courts of law the presiding judge could endure the heat no longer; he dashed his wig from his head, and invited the members of the bar to follow suit. In the country the effect of the high temperature has been most marvellous. The crops, which ten days ago were quite green, are now ready for the sickle; in fact, in many parts harvesting is in full operation. The most serious results of the hot weather, however, are to be found in the greatly increased rate of mortality, especially in the metropolis, during the week ending the 16th instant. The deaths in that week amounted to 1,400; in the three previous weeks they had been respectively 970, 1,034, and 1,326. The average rate of mortality during the past ten years in the corresponding week was 1,100. The comparison, therefore, gives a most unfavourable result, as it shows that the deaths in the present return are higher by 300 than the number which the average rate of mortality for the second week in July should have produced. Diarrhoea has been unusually fatal."

As was to be expected, animals likewise suffered greatly from the extraordinary elevation of temperature, particularly those depastured in exposed situations, where little protection could be afforded by shade. Many cases of sudden death occurred; the *post mortem* examinations showing the vessels of the meninges of the brain turgid with blood,

* Bowman's Introductory Lecture, 1851.

and also the cavities of the heart filled to repletion with soft and dark-coloured coagula. The most serious consequences, however, of the long-continued heat are still being experienced in the loss of lambs. For many weeks these animals have been dying by scores, especially in several of the eastern counties, so as to threaten, in some instances, the loss of the whole flock. Their death is usually preceded by wasting, an ill-conditioned state of the wool, irregular bowels, fastidious appetite, pallid membranes, and husky cough. They thus gradually "pine away," to use an agricultural expression; no ordinary treatment sufficing to arrest the fatal result. On examination, death, in the greater number of instances, is found to depend on structural changes of the pulmonary tissues, and sometimes of the liver. The edges of the lungs, in particular, are consolidated, impervious to air, and often infiltrated with a purulent fluid, seemingly caused by passive congestion, leading to effusion and slow degeneracy of the *liquor sanguinis*, as results of the exhausting influence of the long-continued heat. Besides this cause of death, great numbers of lambs are likewise being lost from the presence of filaric, hair-like worms, in the *abomasum*—the true digestive stomach. The animals present analogous symptoms to those whose lungs are organically diseased; and as such, the cause being overlooked, we are often told that nothing can be discovered to account for death. I do not now stop to go into further particulars of these cases of worms within the stomach, because in the present state of science we cannot satisfactorily trace their connexion with either a paucity of rain or an elevated temperature. There are, however, two remarkable instances of the destruction of animals depending upon the latter cause, which, notwithstanding they have already appeared in the pages of the *Veterinarian*, I think are of sufficient importance to be repeated in this address. The record of one runs thus—

"DEATH OF SHEEP FROM THE SUCKING OF THEIR WOOL AFTER BEING DRESSED."

"A singular circumstance has just occurred in the parish of Cudham, Kent, on Lusted Farm, in the occupation of Mr. James Francis. Mr. Francis has been in the habit for several years of using a wash to his sheep, containing mercury and soft soap, as a preventive against flies. He has generally had it applied by dipping them; but this year he had them laid on their side, and poured the wash—one pint to a sheep—over them. The flock (about 120) having been thus dressed, were turned into a barren part of a field to drip. About an hour or so afterwards the shepherd noticed some of them looking badly, and in a short space of time they began to die, and by the morning only sixteen remained alive out of the entire number. It is supposed that they had sucked the moisture from each other's wool, there being no water in the field, and the great heat causing them much thirst."

The other is an equally interesting and instructive case, as likewise showing that animals when pressed by thirst will take the most deleterious and unpalatable fluids. It is headed

"POISONING OF PIGS BY AN ACCIDENTAL PARTAKING OF SHEEP-DIPPING MIXTURE."

"Within the past month (August) we (the Editors) have been consulted in a similar case to the preceding in the accidental poisoning of some valuable pigs, the property of an influential member of the Royal Agricultural Society. It appears that the shepherd emptied some 'sheep-dipping mixture,' which he had to spare after dressing the sheep, into the yard where the pigs were kept, and that the animals, driven by extreme thirst consequent on the great heat which prevailed, drank some of the fluid. In this way twenty-two were killed. One of the animals was sent to the College, and examined by Assistant-Professor Varnell, who found that the immediate deleterious effects of the agent were produced on the mucous membrane of the mouth and fauces. These parts were intensely inflamed, and covered over with a thick layer of effused lymph, which likewise extended into the larynx and a short distance down the trachea, causing death by asphyxia. The entire lining membrane of the oesophagus was similarly covered with lymph, down to the cardiac orifice of the stomach, which organ, however, was scarcely diseased. The mixture was composed of arsenic, sulphur, and soft soap in solution."

I must here leave this part of my subject, although numerous other proofs could be adduced of the ill effects produced on animal life by the extreme drought and heat of the weather.

Mention has already been made of the great fatality of lambs, at present, arising from entozoa, of the thread-like variety of worms being located within the *abomasum*. Our attention was first directed to this interesting pathological fact last year, in consequence of the serious losses which were being sustained by an eminent agriculturist, who prides himself upon the purity of the breed of his sheep, and the care bestowed on their feeding and management. Notwithstanding the best-directed efforts, his lambs were gradually falling away in condition, and ultimately dying as if from starvation. They had gone on well up to the time of their being about three to four months old, when they were observed to cease growing, and to have an unhealthy appearance of the wool. Their appetites, however, remained good, and the evacuations were for the most part healthy; nor were there any other observable indications of disease, beyond the gradual wasting away of the soft tissues of the body, accompanied in some few instances with diarrhoea towards the close of life. Several *post mortem* examinations, undertaken chiefly by himself, failed to throw any light on the affection, and hence our opinion was sought. On inspecting the animals on the farm, examining their provender, and learning the history of their management, I could gather scarcely any further insight into the cause or nature of the malady, and under these circumstances one of the lambs was killed for my examination. The body was greatly emaciated, the flesh pallid, and the vessels nearly bloodless; but there was no organic lesion of any of the viscera of either the thorax or abdomen to account for these phenomena. Attention was then directed to the internal condition of the digestive organs; and on laying open the *abomasum* I was surprised to find its mucous membrane so thickly studded with minute worms, about half-an-inch in length, that hundreds might be said to occupy but a few square inches. Here was at once a satisfactory solution of the pathological problem. These parasites by their number had drained the system of blood, and thus anaemised and killed the animals. They were so firmly fixed by the insertion of their heads and necks into the membrane that some little force was required for their removal—a circumstance which led to my subsequent examination of them by the microscope. This revealed the singular fact, that a little posterior to their heads the integumental covering was elevated into the form of barbs, with the points directed backwards, thus enabling the creatures to effectually retain their hold of the membrane, despite the peristaltic action of the viscera, and the mechanical attrition of the ingesta against them. A parallel of this adaptation of means to an end is found in the larvæ of the *Astrus Equi*, which is well known to attach itself to the lining membrane of the stomach of the horse by its hooklets, and thus remain for months securely anchored, as it were, to the place of its habitation. Another circumstance worthy of passing remark, especially to the junior students, is that by the location of these creatures within the stomach, we have a beautiful proof of the power of life in resisting the solvent action of the gastric juice. I must not, however, on an occasion like the present, dwell on an inviting theme of this kind, but hasten to speak of other diseases which have prevailed during the same period of time.

With reference to the horse—the animal which many regard as the only one worthy of the veterinary surgeon's care, and who, having their way, would thus "crib, cabin, and confine" the education of the student to the standard of by-gone days in the history of our profession—I believe, he has been pretty

well exempt from any special disease. During the early part of the spring, the so-called influenza prevailed in London and its vicinity, and also in several parts of the country, but it did not assume a severe form, nor extend over any great breadth of our island. The disease partook rather of a bilious character than a pulmonary one, and as such it yielded more readily to remedial measures.

As a general rule we see fewer attacks of epizootic maladies among horses than among cattle and sheep, and this would appear to be the case in other countries as well as in our own. Whether any change by the more immediate application of hygienic principles, in these latter days, for the preservation of the health of the horse, has been wrought in this respect, would be more difficult to decide than may appear at first sight; but be this as it may, many ancient writers dwell particularly on these affections.

To the early poets of Greece and Rome we are especially indebted for accounts of some of them, frequent allusions being made to such maladies in the writings of Homer, who flourished about 800 years before the Christian era. Alluring as it is to follow the flights of a poetic genius in his powerful narrations of such sad events, we must still receive them with some degree of caution, as truth too often is sacrificed to the poet's vivid ideas and figurative imagery.

Virgil and Ovid are among the poets of Rome whose graphic descriptions of these diseases are preserved to us. Did time permit, examples from the writings of each might be given, but I shall content myself by quoting the well-known lines of Virgil, when describing one of these epizootics as it raged among the Alps, probably not less than 2000 years ago.

"Here from the vicious air and sickly skies,
A plague did on the dumb creation rise:
During the autumnal heats the infection grew;
Tame cattle, and the beasts of nature slew."

The steer, who to the yoke was made to bow,
(Studious of tillage and the crooked plough)
Falls down and dies; and, dying, spews a flood
Of foamy madness, mixed with clotted blood."

Tisiphone, let loose from under ground,
Majestically pale, now treads the round."

The rivers and the banks and hills around
With lowings and with dying bleats resound.
At length she strikes an universal blow;
To death at once whole herds of cattle go—
Sheep, oxen, horses, fall; and heaped on high,
The duff'ring species in confusion lie."

Here we must leave this subject, for we cannot at this distant date undertake to decide whether this destruction of horses, as described by the Mantuan poet, in common with cattle and sheep, depended or not on the same affection. We know of no such disease in the present day, although the victims to epizootics are both numerous and various. Ecsema, which attacks the greatest variety of domesticated animals, and even the gallinaceous tribe of birds, is never met with in the horse; nor is the pleuro-pneumonia of cattle or the variola of sheep capable of being communicated to him.

Mention has just been made of epizootic ecsema, which reminds me that this disease has been more rife during the past year than for many previous ones. It has, however, assumed rather the endemic form than otherwise, and hence been confined to localities where secondary causes were in full operation to favour the outbreak. In and around London hundreds of cattle, sheep, and pigs were at one time the subjects of the malady, and to such an extent did it prevail, that for many weeks the animals which were sent from the metropolitan market into the lairs, to await the next market day, were almost certain to be attacked by the disease in the interim. Much solicitude was likewise felt, for fear of its ex-

tension among the cattle which were brought together at the annual meeting of the Smithfield Club, in consequence of its appearance among them. Comparatively speaking, however, only a few cases occurred, the escape of many of the animals probably depending upon a prior attack of the malady, and others upon a state of organism insusceptible at that particular period to the affection. Secondary causes are often too little regarded in these outbreaks, arising in part from their great variety. It is when a disease of this kind shows itself in its sporadic form that we can study the secondary causes to advantage. Several such instances have come under my observation. I will mention, however, but two, as having very recently occurred. In the first, a valuable herd of Shorthorn cows were attacked in consequence of being compelled to drink at a stream whose waters were contaminated by the refuse animal matters coming from some kennels. In this case the disease assumed a malignant type, and several of the animals died, but it did not extend to the other cattle on the farm, although they were placed at a very short distance from them, as these had a continuous supply of pure water. In the second instance the outbreak took place among some pigs which were being fed on the blood and other products of a slaughter-house; and as these animals were located in a yard with some oxen, the malady within a few days had extended to them, but did not go beyond the precincts of the premises. These examples will suffice to show you how important a branch of your studies is an investigation of the causes which regulate the spread of affections of this class.

With regard to pleuro-pneumonia, suffice to say that it also has existed in the sporadic form, with but little mitigation, however, either in its severity or fatality. This malady appears to prevail to a greater or less extent in both hemispheres of our globe, and everywhere to be attended with the same destruction to life. Accounts of its ravages from time to time reach us from the distant parts of America, the West India Islands, the Cape, and even India. So far as we yet know, it has not, however, visited Australia; but it is to be remembered that until 1841 the British Islands were likewise free from the disease. Whether it had previously existed here is a matter of doubt; for, as I have elsewhere stated, an account given by a Dr. Barker, in 1745, of a destructive malady which then prevailed among the cattle, agrees in a remarkable manner both in its symptoms and post-mortem appearances with pleuro-pneumonia. The pathology of this affection shows that, of necessity, it must ever hold its place among the most fatal ones; and hence the deep-rooted anxiety which the agriculturist feels respecting its occurrence in his herd. Hence also the encouragement that is held out for the empiric to practice his frauds upon a too-credulous public.

Before leaving this subject, I would further observe that a knowledge of epizootics is indispensable to your success as a veterinary surgeon, however little you may be enabled to do to arrest their progress, or mitigate their effects. It is to this class of diseases that the principles of hygiene more especially apply, for it is equally your duty to diligently seek out the causes of disease with a view of their removal, as to alleviate suffering wherever it is met with. Humanity also here makes its claims upon you. We do not, I fear, as a profession, sufficiently endeavour to promote the comforts and the well-being of the animals committed to our care. We do not point out how their dwellings might be improved, and their health promoted by a better system of ventilation, and of feeding and management. We are too careless of these things from the force of habit or of custom. As veterinary surgeons, we should recoil at the unnecessary infliction of pain, and loudly condemn any barbarity of practice; but still we pass by things, without

note or comment, by which disease and death are hourly promoted. We want improvement here.

Instruction in the science of medicine in this country has been so long united with the inculcation of the principles of humanity, that no voice is necessary to be raised in its behalf. We feel that man holds but a delegated power over the lower animals, which he cannot violate with impunity. We repudiate the necessity of vivisections in the advanced state of science, and we condemn as unnecessary the performance of experiments to determine again that which had been determined fifty times before; for we believe with Dr. Crampton that "it is a painful and humiliating truth, that the human mind, by being familiarised with scenes of cruelty and horror, may be brought at length to extract from them a kind of insane gratification, which, like other perverted passions, extinguishes all the finer and better sympathies of our nature." And further, "that the public exhibition of torturing experiments on animals exercises a corrupting influence on the minds of those who witness them, and ought not to be tolerated." Cultivate, then, this higher principle of your nature; for, you may rest assured, that while it promotes your own happiness, it will at the same time tend to raise you in the estimation of every right-thinking individual, whose good opinion you are wishful to obtain.

Having now glanced at several of the subjects which are contained in the curriculum of your studies, I proceed to make a few observations on the means which are afforded you for their acquirement.

The imparting of information by the delivery of lectures has long taken precedence of all other methods of instruction in science. It is the most pleasing and inviting, as also the most ready means of impressing the mind with the truths it has to acquire. Like all other good things, it has, however, its alloy; too much dependence is often placed upon the teacher by the pupils, who, in their turn, will thus become indolent in seeking further knowledge by reading and investigation. While, therefore, it is the province of the teacher, in his inculcation of principles, to seize upon the rallying points of his subject, to separate the valuable from the useless; it is no less the duty of the student to make the matter his own, and by subsequent research to complete his knowledge respecting it. In this way alone can your minds be stored with information, which is hereafter to be applied to your own benefit and to the advantage of those you are looking to for support. Nor must you omit to be regular in your attendance at the lectures. An occasional absentee differs but little from him who designedly neglects to be present. He has lost, perhaps, it may be, the very thing he was solicitous about; so he has missed the practical application of principles he had heard previous expounded.

Another great error with some is that of deciding for themselves what is important and what is not; and thus they studiously avoid, first one thing, and then another, until they find at last they have made shipwreck of their talents and their time. Talent without industry and perseverance is of little worth. It is the diligent pupil who, early and late, is to be found in his place; who plods on day by day; who receives the inculcations of his teachers in a right spirit, and who has determined to gain the honour he has come to seek—that of being a graduated member of his profession—who will be sure to succeed. It is well that such should know that, in the long run—even if they lack the advantages enjoyed by others, if their mental culture has not been equal, nor their worldly means so great—they will outstrip those who, possessing these things, lack industry and application. Let me, then, intreat

one and all of you to persevere, "to impose activity upon yourselves as a positive rule and duty, to be punctual and regular in your attendance, and to allow nothing to induce you to give up even a single lecture."

After the observations which were made in a former part of this address, it is almost unnecessary to say that the lectures delivered here by the several professors embrace the anatomy, physiology, and pathology of the horse and other domesticated animals; chemistry, materia medica, and therapeutics; veterinary jurisprudence, and the principles of surgery. The names of the principal of the college, Professor Spooner, and of Professor Morton and Assistant-Professor Varnell, as officers of the institution, with whom I have the honour of being associated, are not only as familiar to you as "household words," but are a sufficient guarantee that your studies will be rightly directed, and full justice done to their respective divisions of veterinary science. It may with truth be said, that they have now spent many years of the better part of their active lives in the service of the profession; and that if they have not resped any other reward, they have at least this one, that, in proportion to their abilities and powers, so have they continually vied with each other to promote its onward progress. If, then, you possess long-tried and faithful teachers, and it should still be found that you fail to profit thereby, the only inference which can be deduced is that you neglected to give heed to their instructions, or to co-operate with them in furthering your professional education.

This brings me to say a word or two upon the facilities which exist for the acquirement of practical anatomy. I would, however, remark, in the first place, that the most erudite descriptions on the part of your teachers, as well as the most punctual attendance on their demonstrations, will alike fail to make you practical anatomists. This knowledge must be acquired by yourselves, and for yourselves. Early and late must you labour with scalpel in hand and text-book by your side, in disuniting the one from the other of the several component parts of the body, and in studying their mutual relationship and development. Minutes of this kind must be mastered, or you can never hope to rise to eminence in your profession. It may be true that you will never have to perform those delicate operations which the human surgeon has, but in the daily routine of practice you will have a far greater necessity for an intimate acquaintance with the details of organization. Scarcely a case of lameness can be brought before you without requiring for its correct diagnosis a knowledge of the several structures of the limb; and in the examination of horses upon purchase, this branch of science is perfectly indispensable. Your teachers have not been unmindful of these things, nor of the assistance which you will require in your dissections. To perfect you, therefore, in this branch of study, and also to stimulate your exertions, prosectors will be selected from among the senior pupils, who, on passing their examinations, will receive certificates of their having filled this office. Besides the daily demonstrations in the theatre, arrangements have likewise been made to fill up the vacancy which had been caused by the retirement of Mr. Corley, by the appointment of Mr. Good as your future instructor in practical anatomy in the dissecting-room. 'Tis but recently that this gentleman occupied his place among you as a student; and his uniform good conduct, gentlemanly demeanour, and unremitting attention to his studies, at that time, are our assurances that he will faithfully perform the duties which now devolve upon him.

I come now to the means at your disposal for obtaining a knowledge of pathology.

The nature and consequences of the several maladies affect-

ing animals, together with the principles regulating their treatment, medically or surgically, will be inculcated in the lecture-room; but it is in the Infirmary where, in your daily round with your teachers, you must observe the symptoms and watch the progress of each particular affection. The number of patients which are admitted, will afford a fair opportunity of your mastering the details of practice as it occurs in this large metropolis. On the whole, however, the variety will not be so great as is seen in many parts of the country. Your teachers will endeavour to compensate for this, by making clinical observations on the morbid specimens, and the history of cases, which, from time to time, are forwarded from the country, both by veterinary surgeons and the members of the Royal Agricultural Society, as with this society the College has long co-operated for the improvement of the treatment of diseases of cattle and sheep.

By appointment also of clinical clerks, an additional help is afforded you of studying the phenomena of disease. While performing these duties you will be careful to note the progress of the several cases from day to day, and thus discipline your minds for that reflection on cause and effect which must be the guide of your future practice. You should learn also to make your own diagnosis from what you observe, and see how it accords with the opinion of your teachers, and the remedies that are employed. Experience will soon correct the faults which you may have committed, and thus, imperceptibly as it were, you will be laying a solid foundation for your fame as scientific practitioners, to rest securely upon. Now and then an opportunity will likewise be afforded you of seeing the post mortem appearances of cases which had been treated in the Infirmary. These must receive your especial notice, with a view to compare the lesions that are disclosed, with several symptoms which existed during life. Let all such investigations be recorded by you for future reference; they possess a value far beyond any you may at first suppose.

The examination of horses for soundness forms a large portion of the practice of the College, and hence its value to you. To it you should give assiduous attention, and note the several causes of unsoundness and the relative importance which is attached to each. Some things, which to you may appear trivial, will be greatly objected by the examiner; while others, on the contrary, which perhaps may seem to you to be serious, will be as lightly thought of by him. Experience alone can give this knowledge; but seeing its results, his experience becomes as it were yours, and is to be used by you for your own advantage.

There is no branch of your profession which will test your acquirements more severely than the examination of horses. Often will you find yourselves in antagonism to those who have passed through the same ordeal, and obtained their professional education from the same source as you have. This is much to be regretted; and the more so, as we see no effectual remedy for the evil. On matters of opinion there will ever be a difference, but on matters of fact there surely ought to be none. Much might be said on a subject like this, but time forbids it being now little more than glanced at.

To proceed. The next thing to which I direct your notice as a means of obtaining knowledge, is the Veterinary Medical Association. At its weekly meetings, papers are read and discussed, morbid specimens exhibited, and the treatment of diseases criticised. As the Society is based on the mutual instruction plan, so, when its debates are rightly conducted, it cannot fail of being everything its founders desired it should be for your improvement. It has been said that "reading makes a full man, writing a correct man, and speaking a ready man;" and as in this Society all these essentials are brought

into active exercise, so it must ever hold an important place among the auxiliaries to your studies. You will do well, therefore, to become members of the Society, and by it contribute your portion to the general fund of veterinary knowledge. Connected with the Society is a most valuable library, of both old and modern authors. These works, subject to certain regulations, are circulated among the members, affording them every facility of storing their minds with the general literature of medical science. Mention may here be made of some of the books which you should consult. Books, however, as has been rightly observed by Dr. Gill, are but secondary aids to knowledge. They can be read to advantage only after observation, or as helps to it; to trust to them alone, is to spoil the faculty of observation; for we do violence to our intellectual nature, when we take that on faith which should be admitted only on demonstration. Knowledge so acquired, however full and sound and beautiful it may seem, is but as the child's bubble, and will collapse on the least contact with the realities of practice. Percivall's "Anatomy of the Horse" is the text-book of the dissecting-room. It only treats, however, of descriptive anatomy, and even in some of its details may be found to lack sufficient explicitness for the student of the present day; still, it is to be preferred to any other. For general or structural anatomy "Quain and Sharpey's Elements," holds a deservedly high position, and should be carefully studied by you on the several tissues and composition of the body. Todd and Bowman's "Physiological Anatomy" is a work of the same class, and of the highest order. The books exclusively devoted to physiology are now so numerous and meritorious, that it is indeed difficult to make a selection; but in this institution we have been chiefly in the habit of referring to Carpenter's "Manual," and also to his more extended work on the "Principles of Physiology, General and Comparative;" and likewise to Kirke's and Paget's excellent "Hand-book of Physiology."

On chemistry you will study the profound writings of Brand, Bowman, and Fowse in particular; and on Veterinary Materia Medica and Therapeutics, you have the book of all others, Morton's "Manual of Pharmacy," a new edition of which (the sixth) will shortly appear. His "Toxicological Chart," you will also find an indispensable in the after-practice of your profession. Headland's "Action of Medicines" is likewise especially suited for your study. On Surgery and Pathological Anatomy, you should refer, among others, to the writings of Millar, Cooper, and Liston, as also to Paget's "Surgical Pathology," and Andral's "Pathological Anatomy." The pathological works relating immediately to veterinary science, are so numerous, and of such a diversified character, that time will only allow of my mentioning the names of some of those who have thus done a lasting honour to our profession. Coleman, Percival, Blaine, Youatt, Clark, Turner, Field, and Spencer are of this number. This list might be greatly extended, and doubtless should be, if merit and literary talent, wherever it is found, had to be brought to your especial notice; but with these names we must rest content for the present. I venture one more remark on this part of my subject, even at the risk of being charged with self-laudation, and that is to recommend to your notice the only journal which exists in this country, entirely devoted to the interests of our science, "The Veterinarian." This work, after having held on for thirty-two years, may be rightly said to be the property of the profession, and to be both in usefulness and intelligence just that which the profession likes to make it. Let us hope that as it further grows in years it will increase in vigour, and be all its long-tried friends desire it should be.

Thus, gentlemen, I have attempted to place before you an

outline of the facilities afforded by the College for your instruction. These might have been added to, as well as the subjects themselves have been expounded at great length, and with far more precision and force, had the delivery of this address been undertaken by either of my colleagues. Quoting the language of one of them, "I could have wished that this honour had been conferred on either of them instead; for they from 'thoughts that breathe' would have given you 'words that burn,' and thus probably have engaged your attention during the current hour."

And now a word on the period of time which must be spent in the acquirement of knowledge, before presenting yourselves for examination in accordance with the regulations of the Royal College of Veterinary Surgeons—two sessions, or, as it may be said, nearly two years. This may seem to some a long time, but you will find it little enough for all the work you have to do, even if each session is honestly devoted to its purpose. Many, alas! fearfully shorten the period by their negligences; and then, by their rejection by the Court of Examiners, they have to reap the fruit of their misspent hours. Let such be the case with none of you.

Some among us who look for change and progress in accordance with the spirit of the times in which we live, have desired that the period of study should be extended, or at least that the pupils who have not enjoyed the advantage of being previously placed with a veterinary surgeon should devote a third session to their studies. This suggestion, simple and consistent as it may seem, cannot as yet be adopted, for it forms but an item of a scheme of great changes, the time for which is not yet come, and the desirability of which I must leave to others to determine. The union which exists between this institution and the Royal College of Veterinary Surgeons, and which has never been completely severed, although at times greatly endangered by conflicting interests, does not depend on any alterations in the curriculum of your studies. The desire of all is, that science, instead of being opposed in her progress by the contending elements of discord, may be allowed to pursue her way amidst the alluring paths of peace, as by this alone can her votaries be advantaged.

I proceed to the last part of my subject—the *encouragements which are held out for perseverance*. Here I must be exceedingly brief, as I am reminded that time passeth by on the wings of the wind. It was rightly observed by Professor Spooner, in his inaugural address of last year, that "you have the *prestige* of your name and fame committed to your own hands." As a profession, there are few honours to look forward to, beyond the one of a life well spent in the performance of duty. Nor do great riches await you: still, a competency is the sure reward of labour, and a good standing in society a certain consequence of honour and integrity. As an incorporated profession, some of you perchance may rise to be members of its council, vice-presidents, or even president; for there are no barriers here, save such as are created by the members of the body corporate themselves. The Court of Examiners has also its veterinary section; and surely it is an honour worth seeking—a seat at that board, coupled as it is with the respect and appreciation of some of the most distinguished teachers of the science of medicine. Nor can we, the officers of this institution, even if health and prolonged life be granted us, continue many years. Sooner or later, others must take our places, and devote their time and talents to the higher elevation of the profession, by an improved system of education.

The connexion which happily exists between the Royal Agricultural Society and the College has also, among other advantages, opened the way for the appointment of veterinary

surgeons, throughout the country, as sanitary inspectors the meetings of the different local societies. Scarcely an agricultural association of note can be found, that does not recognise the value of our profession in guarding against the transmission of hereditary diseases among domesticated animals, and in preventing the substitution of older for younger animals. The proper performance of these duties is of the first importance to the public at large, as well as to the agricultural community itself. The durability of a society often hinges on the correctness of the opinions given, as well as on the manner in which the entire duties are performed, by its veterinary inspector. Integrity, judgment, and industry are the prerequisites for appointments such as these.

Another inducement to your perseverance in all which befits a professional man, is to be found in the appointments to regiments of yeomanry cavalry. Recent circumstances, unfortunately, have compelled us to place ourselves in a fit state of defence; and hence these corps are likely to be increased in number, throughout the length and breadth of the land. To each of these is attached its veterinary surgeon. The Army—both the Home and Indian division of it—often probably the greatest of all incentives to your becoming intelligent and well-qualified practitioners, by the encouragement it holds out to those who prove themselves eligible for appointments therein. The honour is due to the late Professor Coleman, of securing for veterinary surgeons the rank of commissioned officers, than which nothing tended more to raise the dignity of our art, and to place the stamp of public approbation on our services. Within the last few weeks, a new era has, however, dawned upon the army veterinary surgeon, which, through him, is reflected upon the whole profession. We hail this with much satisfaction; and we desire to express our public thanks to its chief author, the Principal Veterinary Surgeon, Mr. J. Wilkinson, and to all others who have assisted him in his labours. By Royal warrant, an increase of pay and rank has been conferred on the army veterinary surgeon.

The provisions of this important measure are such, that I feel assured they will excite the liveliest feelings of interest throughout the profession. Much do I desire that time had allowed of my dwelling on a theme so inviting as a Royal honour being so liberally bestowed upon us. Elsewhere, in the pages of "The Veterinarian," you will read our sentiments; and to some of these we have to look to you for a response.

And now, to bring this too long address to a close, let further words of mine, after the counsel I have given, should fall listless on your ears, I will adopt the soul-stirring language of Bowman, when addressing the students at King's College, and say with him: "Gentlemen,—Think nobly of your profession, and by your conduct make it worthy in your own persons of the standard at which you estimate it. Remember that its end is beneficent, its studies ennobling and elevating, its ministrations an exercise of our best faculties, and in harmony with the whole constitution of our nature. To excel in it is an aim worthy of all your aspirations, of all your energies; but requiring mental and moral discipline—patient and sustained labour. Go forward in this path with diligence: make your difficulties a school, in which the strength of character may be tried and formed, and convert them from adversaries into your best friends. There is no sweeter recollection than the sense of difficulties overcome. Strive rather to shine in yourselves, than to outshine others. Seek less to derive honour from your profession, than to honour your profession by your virtues. Cultivate a love of knowledge for the sake of the benefits it will enable you to dispense, as well as for the gratification of your own higher tastes and capacities; and then,

whatever worldly fortune betide, you will win the most valuable of blessings which the occupation of a life can confer—the satisfaction, in the retrospect, of having improved opportunities, of having acted on right principles, of having been

the honoured means of benefiting your fellow-creatures, while humbly, yet earnestly, endeavouring, under the Divine blessing, to accomplish the will of your Maker, and to live to His glory.

SUPPLY OF WOOL FROM INDIA.

DEPUTATION FROM THE BRADFORD CHAMBER OF COMMERCE TO THE RIGHT HON. JAMES WILSON.

On Tuesday, October 4, a deputation from the Bradford Chamber of Commerce had an interview, at Manchester, with the Right Hon. James Wilson, the new financial secretary for India. The interview took place at the offices of the Cotton Supply Association; Thomas Basley, Esq., M.P., with whom Mr. Wilson sojourned in Manchester, being present.

The deputation consisted of Mr. W. E. Forster, Mr. Whitworth, and Mr. Darlington, secretary.

Mr. FORSTER opened the proceedings by stating that there was already a very large trade in wool with India. In 1830 there was practically no export of wool from India. In 1840 the wool imported thence to this country weighed 2,441,370 lbs. In 1857 the quantity was 19,370,741 lbs., or an increase in eighteen years of 800 per cent. (Hear, hear). From Australia the exports of wool during the same period had increased only 500 per cent. From the whole world the import of wool had increased from 49 million pounds to 127 million pounds, or 260 per cent. In 1840 India supplied only 4 per cent. of the whole, but in 1857 that country supplied 15 per cent. (Hear, hear). Large, however, as the increase had been, they had every reason to believe that it might be very much larger, and also that the quality might be made very much finer and more valuable (Hear, hear). At present the wool received from India was used almost entirely for rough cloths and similar purposes. He did not suppose that Government could immediately issue regulations to control the native growers, but he thought that they might support the advice which they were about to send through the Chamber of Commerce of Bombay to the growers, namely, that they should clip only once a year. If this were backed up by Government, they had reason to hope for beneficial results. The "black mail" formerly levied upon growers had been abolished (Hear, hear). Mr. Forster pointed out upon the map of India the districts from which the wool chiefly came, and remarked that almost all the hilly districts would grow wool. He had that day received a letter from a gentleman named Milligan, a nephew of the late representative of Bradford, and who had just been to India, and he stated that he was perfectly sure that the country in our possession would grow wool, greatly to the increase of the revenue. Wherever the temperature was moderate, wool could be grown. The way in which the supply had so enormously increased gave hope that with better care there would be an almost unlimited supply. The native grower bartered the wool for other articles, and it left his hands at about 0½d. per lb. No doubt if well taken care of, it would be worth double that price, and the native growers would get a far better price if English capital and enterprise were employed. One of Mr. Wilson's objects would no doubt be to seek for new outlets for different products. At present this wool came across the Punjaub. Now Karachi would be a good port, and there were railways connected with it. They did not ask Mr. Wilson definitely to do these things, but they were glad that in the present state of the finances of India he was going out (Hear, hear). They entirely responded to Mr. Wilson's sentiments, and while

hoping that the expenditure might be considerably diminished, they had also great hopes that by increasing the prosperity of India, and its trade with England, that the revenue of India might be increased. The wool trade of India with England admitted of a great amount of increase, and this was the point that he hoped the right hon. gentleman would bear in mind (applause).

Mr. WHITWORTH followed with some practical remarks on the capability of India to produce the kind of wool they needed, namely, that having length of staple and of similar kind to English wool. Some of our colonies offered greater facilities for the growth of wool, but not the peculiar kinds they required. Mr. Wilson was, no doubt, aware of the importance of this subject, and also conscious of the striking development there had been in the productiveness of the colonies and dependencies of Great Britain. It was singular that within the last quarter of a century—he quoted from the *Economist* of September 10, 1859—cotton and wool imports had increased 3½ times what they were in 1833. Therefore it might be thought that we ought by this time to have wool in abundance; but the generality of wool produced, especially in England and many European countries, was only adapted for woollens. One of their chief wants was to have the wool grown its full length, or a whole year's growth, fit for combing purposes. At the Cape of Good Hope the growers had been in the habit of cutting the wool twice a year, but at a recent meeting a great number of wool-growers had agreed to clip the sheep only once in nine months. Whilst short wools and low wools were reasonable in price, long wool was of enormous prices. Long wools were worth 20d. a lb., but similar qualities in short wool did not fetch more than 11d. or 12d., the only difference being the length. This was heavily felt by certain branches in the woollen trade. Mr. Whitworth noticed the intimate connection there was between the cotton and worsted trades. The impetus in the growth and use of cotton had improved their trade. Mr. Basley would be well acquainted with the fact that the main produce of the mills of Bolton found a market in Yorkshire in supplying that for which worsted was formerly used. A better supply of wool would tell favourably upon the cotton trade, and they felt the vast importance of the labours of the Cotton Supply Association, and most heartily desired to second their efforts. In Halifax they were represented by the Secretary for India, and they had made up their minds that they would apply all the pressure they could, with any sort of decency, in this direction (Hear, hear, and a laugh). They believed that Mr. Wilson was earnest for improvements, and that the system of red-tapeism was doomed. India possessed all the requisites for giving them all they wanted, whether in vastly increased supplies of wool or cotton. India possessed a large amount of cheap labour, while the enormous profits on cotton were leading to the prosecution of one of the most wicked traffics known to humanity—the slave trade (Hear, hear). Mr. Whitworth concluded by expressing the general delight at the appointment

of Mr. Wilson, with a fervent prayer that his health and strength would be spared to enable him to accomplish the work for which he was eminently fitted (applause)

The Right Hon. JAMES WILSON, in reply to the deputation, said that the subject to which they had drawn his attention was one in which he naturally took a very deep interest, because his family had been for many generations connected with the woollen trade, and many of his own relations were still so engaged very largely. This particular development of the woollen trade was one of peculiar interest, inasmuch as it exhibited in a very striking manner what were the capabilities of India. He remembered meeting Mr. Forster at Sir Peter Fairbairn's in 1851, and at the same time he came to Manchester, and saw Mr. Basley and the late Sir John Potter; and the object of his visit at that time was to call the attention of his friends, there and in Leeds, to a new market which was then opened up by the Government (and he happened at that time to be secretary to the India Board), in the part of the country from whence this supply of wool had come. Mr. Freer, our resident in Scinde, and who was a man of very great energy and attention to his duties, suggested to the home government the propriety of opening the port of Kurrachee, and establishing there an annual fair, for the purpose of accommodating the native dealers, who came with caravans from Cabool and other districts at least once a year, with their produce to exchange for our goods. The Government immediately took steps to carry out his views and recommendations in the quickest way possible, being fully sensible of the benefits that would result (Hear, hear). That was in 1851. They wrote to Mr. Freer and desired that he would send home samples of all the different descriptions of goods, woollen and cotton, that were used in those districts; which he immediately did, and they were forwarded to the manufacturing districts. Statistics showed that about 1830 no wool was imported; but as soon as we became possessed of Scinde a small quantity of wool was imported. About 1840, as Mr. Forster had stated, the imports did not much exceed two million lbs. In 1851 it had reached four millions. As soon as that fair was established at Kurrachee, the impulse given to it had been so striking and rapid that it had increased to near 20 millions lbs. in 1857. He learned from a report recently received from Mr. Dalsiel, custom-house collector at Kurrachee, that the trade of that port, which in 1851 was nothing, was last year two millions sterling (Hear, hear). This he (Mr. Wilson) looked upon as one of the most hopeful symptoms and evidences of what might be done by carrying out similar principles in other parts of India. Mr. Forster was quite right in saying that the chief part of the wool imported from India was from the territories west of the Indus, and therefore not from English possessions; and he was quite right when he said that the trade was very much limited in consequence of the "black mail," which was not levied in one place, but by every little horde of highwaymen, as they might almost be called, through whose district the wool passed. Mr. Freer

took a step, almost on his own responsibility, of leading to some of the native chiefs across the Indus a few English soldiers to clear the passes; and from that day the way had been opened at much less cost, and the road was much more free (Hear, hear). With regard to an improvement of the quality, the only suggestion he could make of a practical kind would be, that they should send out samples of the longer sorts of wool to the port of Kurrachee, and if they were sent to Mr. Dalsiel he would give every possible attention to their requests, by explaining to the merchants, and through them to the growers, the advantage of producing the wool of long staple. There was no doubt that all the hilly districts were capable of growing wool, and did grow it. Not only the hilly districts in India, but also the plains, produced sheep in very large abundance, mutton being the chief animal food consumed. The quality of the wool varied with the climate; when very hot or very cold, the wool turned to hair; a temperate climate was requisite for producing wool suited to their purposes. No doubt upon the high lands the wool grown must be suitable. No doubt with regard to wool, as with every other production, one of the great difficulties hitherto of collecting—not of producing—and rendering available for shipment, had been the want of the means of transport (Hear), and he was afraid this would long remain one of the reasons why the products of this wonderful country were not more bountifully supplied to Europe. He was glad to say that Mr. Freer was appointed as his colleague, a member of the Supreme Council of Calcutta; he would have, therefore, every opportunity of communicating with him on this very interesting and important subject, and of advising with him how best to carry out their views (Hear, hear). This it should be his pleasure and duty to do as soon as he arrived in India. Mr. Freer's practical knowledge of the country and his high business qualifications would have suggested to him the removal of any obstacles that could be removed to the introduction of improvements. The subject should also receive his best attention, and if there were any suggestion which he thought would be of use, he would take care it should be communicated to them (applause).

Mr. FORSTER said he was sure that the high opinion entertained of Mr. Wilson by those whom they represented, would be very much increased when they made their report. He well remembered the visit to which Mr. Wilson had alluded, but he was not aware that the fair at Kurrachee was in such thorough operation.

Mr. WILSON added a hope that English enterprise, which was never wanting on these occasions, would very soon, at so promising a place, establish houses for direct trade with England and Kurrachee, instead of doing the trade as now through the interposition of the Bombay houses. This would save the double voyage. The packing might be done at Kurrachee, where there was an excellent harbour.

The deputation retired, after expressing their grateful acknowledgments for the kindness and courtesy of the right hon. gentleman.

PROTECTION TO AND PROFITS OF AGRICULTURE IN AUSTRALIA.

TO THE EDITOR OF THE ECONOMIST.

SIR,—It would be interesting, I have no doubt, to many of your readers as to myself, were you to notice an article in *Fraser's* (September) *Magazine*, "On the Effect of the Gold Discoveries on Australia itself," or at least notice the subject.

I have a relative intending to emigrate there, or to New Zealand, taking out a few thousand pounds with him; and it

strikes me that the arguments of this writer are sound, viz., that the application of capital in agricultural, pastoral, and other pursuits must not be expected to be steadily remunerative as long as the gold-diggings maintain their present position; that, in point of fact, Australia imports a large portion of its corn, butter, and timber from Europe or other countries, where it can be produced at a cheaper rate, because the wages

of labour are much lower; and that this state of things cannot alter while the gold-diggers average 10s. a day. The outcry for more emigrants, re-echoed in every colonial newspaper, shows how severely this disadvantage is felt. But neither is this a very enlightened cry, because if emigration were much greater than is likely, or even I may say possible, while other quarters of the globe also offer so many attractions, the profitable gold-diggings would draft off the labourers from the lands and the flocks, and leave the capitalist much in the same position that he was before.

Now, do you agree with this writer in his conclusions? There have been two or three able articles in the *Economist* on the effects of the gold discoveries on the world at large, with regard to the great question of depreciation or non-depreciation of prices, but not one, I believe, on the effects upon Australia itself, and upon capitalists settling there.

I remain, Sir, yours faithfully,

Manchester.

H. M.

Our correspondent fears that the agriculture of our gold-producing colonies will be injuriously affected by the high money wages which have been paid there since the discovery of gold, and he does not seem to stand alone in his apprehensions. The most recent intelligence from those colonies affords a singular comment upon them. A cry—not, we are glad to say, a very strong cry—has been raised for a protection to domestic industry, and especially to domestic agriculture. Public meetings have been held both in New South Wales and in Victoria; and we have now lying before us a newspaper published in the latter colony, which is by no means ill-written, and which decidedly repudiates the 'crude system' of free trade. The demand for legislative encouragement is based, as usual, on the ground that agriculture is not, without it, very profitable.

The gold colonies are, in fact, in a very exceptional position. In general, new communities which have at their command a virgin soil raise their own food; and where the soil is reasonably productive they export food for the subsistence of older and more densely-peopled countries. They in that manner purchase comforts and luxuries which they could not otherwise enjoy. But Australia and California are circumstanced differently. It does not pay them to produce corn for exportation; they have a most wonderful facility in producing gold, which all the world wants, which they export to older countries, and by means of which they obtain such an abundance of luxuries as no colonies ever before had. It is more profitable to the colony to produce gold than it is to produce corn. The general interest of the world requires that the peculiar facilities of this community should be employed; and even if it were not so, that community will, with the instinct of self-interest, select the pursuits in which they have such facilities in preference to all others. Even, therefore, if the agriculture of Australia and California had not increased, or even if it had diminished since the discovery of gold in them, we should have seen no reason to regret the fact as far as those countries were themselves concerned. They have better means of producing another commodity, and were right in using those means as far as it was possible.

The fact, however, is, that the agriculture of those countries has of late years rapidly progressed. We find from an official document printed by order of the Governor, at Melbourne:—

"Since the year 1854 the progress of agriculture has

been much greater than that of population. The increase in 1857 as compared with 1854 was more than 400 per cent., while the increase in the number of inhabitants, according to the census of those years, was 73 per cent. If agriculture continues to progress in this ratio, the country will not merely supply its own wants, but produce a large quantity in excess."

The same return gives the following table:—

	1852.	1853.
Total number of acres cultivated.....	57,398	237,729
Acres under wheat	29,633	87,230
" barley	1,327	5,407
" oats	6,426	40,118
" potatoes	2,375	20,698
" other crops	17,547	84,281

In California the progress of agriculture is even more remarkable. In spite of the enormous increase in her population—the growth, in fact, of a numerous, highly-paid, and highly-fed community—she exports food.

The explanation of this remarkable progress is given by another part of the same series of returns. Both Victoria and California are not only rich beyond example in mineral wealth, but their soil likewise is of the greatest natural fertility. Although, therefore, they have an enormous inducement to produce gold, they have a still greater inducement, on the most fertile parts of their beneficent soil, to cultivate corn. The facts are these:—It appears that in the newly-peopled States of America about twelve or thirteen bushels of wheat are considered to be a very fair, and rather more than an average yield for land per acre. How much that of the two gold-producing regions exceeds this, and also how much it exceeds that of one or two other countries which are not barren, is evident from the following table:—

COUNTRIES.	Bushels per Acre.		
	Wheat.	Barley.	Oats.
Victoria, average of the years 1855-6-7	23.1	30.3	29.3
Tasmania, 1850	16.5	24.2	23.7
South Australia, 1857	12.0	22.0	25.0
New South Wales, average of 3 years	15.4	16.7	16.7
State of New York	14.0	16.0	26.0
State of California, 1855	20.0	31.5	20.2

It seems rather hard that South Australia, which produces no gold, should be under so great a disadvantage likewise as respects agricultural fertility. Such is evidently, however, the case. The gold-producing parts of Australia, and likewise California, are in a position to resist the extreme temptation which we mentioned, to forego all other pursuits for that of gold production. In one at least there is a prospect even more tempting.

This view of the actual facts gives an easy answer both to the protectionist of the colonies and to our correspondent. It would not be surprising if so rapid a progress as that which we have indicated may have for a moment gone further than was desirable, though we do not know that it has done so. The most singular natural advantages may be pressed too far. It may be, that a temporary check to an over-quick progress is the explanation of the alleged depression in Australian agriculture. But this only shows with greater clearness the absurdity of asking legislative protection for the cultivation of such soils with such a market as that of the gold-producers so near to them. If people leave

such an occupation as that, there must be extraordinary gains elsewhere. If these natural advantages will not induce people to cultivate the soil, legislative inducements would probably be ineffectual as well as undesirable.

The difficulty suggested by our correspondent is also, by the aid of the facts, to be seen in its true light. It is quite true that the discovery of gold has raised wages in the colony, and has not raised them in Europe. It is quite true that for a long time the value of labour in Australia is likely to be considerably greater than it is in most other countries. This is the certain and neces-

sary consequence of such events as the gold discoveries. They increase the price of commodities, and they augment the cost of home production, and therefore they act as a premium on importation. The able writer in *Fraser* is quite correct in insisting that the gold discoveries, by giving a singular bounty to one pursuit, operated to that extent as a discouragement to other pursuits. But experience proves that the natural advantages of agriculture are so great as to enable it, nevertheless, to maintain for some years a rate of progress that is certainly very remarkable, and is nearly unexampled.

THE AGRICULTURE OF PRUSSIA; OBSTACLES THAT PREVENT ITS PROGRESS.

The system adopted by most of the Governments on the Continent since the era of the French revolution, and as a consequence of that event, is at once anti-progressive in regard to industrial pursuits, and revolutionary in its political tendency. With the latter effect we have no otherwise to do than as it affects the advance of social and industrial improvement. But its chief bearing is upon the land, and that portion of the population connected with it. In speaking, therefore, of the agriculture of Prussia, it is impossible to avoid a reference to those political arrangements which retard or promote, as the case may be, the cultivation of the soil and the increase of its productions.

At the commencement of the present century the Prussian Government found itself involved in the wars of Napoleon, which threatened the very national existence of the state. At that period the feudal system existed in all its rigour in Prussia, the land being chiefly divided into large baronial estates or seignories, belonging to the nobility. The rural population were serfs or slaves, having no political rights, but subject to the uncontrolled sway of the seigneur, who possessed a complete civil jurisdiction within his seignory, and, virtually, the power of life and death over them, the appeal to the sovereign being attended with difficulties so great as to render a resort to it almost impossible. But whilst on the one hand they belonged to the estate, could not leave it without the sanction of their lord, and were, in fact, bought and sold with the property as part and parcel thereof, they, on the other hand, possessed a tacit prescriptive right in the soil to a certain extent, of which the seigneur could not dispossess them. They held a small portion of land, for which they paid a *rent in kind*, and performed a certain amount of labour on the domain and other services. Whilst these were performed the seigneur could not deprive them of their holdings, nor of any property they might have acquired.

Such was the state of things in Prussia, when the condition of active warfare, in which that country became involved with France, rendered it desirable to give to the masses a more direct interest in the soil, to induce

them to exert themselves in its defence. The Government, therefore, determined upon the emancipation of the serfs, and a distribution of the land amongst them, so as to give them a personal interest in the defence of the country.

It was in the year 1807 that the series of enactments for this purpose was commenced, by which the old feudal system was abolished, the whole rural population emancipated from serfdom, and the lords of the soil, the landed aristocracy, compelled, on certain conditions, to grant them a share of the land in perpetuity; in some cases on payment of a fixed sum, either in hand or a security given for such payment. But although the act or decree was compulsory on the seigneur, it was optional on the part of the peasant; and, in the first instance, many of them who were under kind and humane masters, to whom they were consequently attached, preferred remaining on the old connection. We believe, however, there are now but few who have not availed themselves of the law to become freeholders. The enactments by which this great change in the policy of the Prussian Government and in the condition of the peasantry was effected were completed in 1811.

By this measure, the rural population of Prussia were nominally elevated in their social position, and were ostensibly introduced to a political existence as occupying *collectively* the local relation to the state of the former possessors of the soil; and they thus became the most important element in the social body. Unwilling, however, to surrender any portion of its own power, whilst it annihilated without scruple that of the ancient nobility, the Government feared to take the next important step, of giving to the people a constitution, although the promise to that effect was solemnly repeated and pledged at the Congress of Vienna, in 1815. Freedom from local oppression was granted, and the means of subsistence by their own industry secured; but political freedom was still withheld, nor had they political influence in any form whatever; no representative legislature, no voice in any of the measures of the Government. In the place of the ancient aristocracy, a new and numerous body of functionaries was created, whose

interference in all the arrangements of social life are quite as onerous, and far more annoying and galling, than that of the former master of the peasantry. Every domestic institution, every civil appointment, every movement of the people, was under the servillance and control of the Government, in which was centred the active power over the social, civil, and political affairs of the nation, uncontrolled by, and irresponsible to, any jurisdiction whatever.

But the Prussian Government did not confine itself to the changes we have described, nor deem the power it had thus acquired over the masses of the people a sufficient safe-guard to the Crown. The kingdom of Prussia is composed of various nations, each of which possesses a nationality of its own, and between which there is little or no sympathy: The war with the First Napoleon had taught the King of Prussia his weakness, and the necessity, if he could not create a common national feeling amongst them, of uniting them in one universal military organization. The law of conscription also, adopted in France by the Republic, and continued by the succeeding governments, by which 80,000 of the male population were annually enrolled in regiments of the line, rendered that country a dangerous neighbour, and suggested the necessity of a somewhat similar measure to prepare the country against whatever contingencies might arise. With these objects in view, the *Landwehr* was instituted, the operation of which, as it has a material and powerful influence over the agriculture, as well as every other branch of industry of that country, we shall now describe.

By this law, every male inhabitant of Prussia, whatever may be his rank, wealth, station, profession, or calling, is compelled, between the ages of twenty and twenty-five years, to serve for three years as a common soldier, in a regiment of the line. This system was established by decrees of the 3rd September, 1814, and the 21st November, 1815; and such is the rigour and impartiality with which it is enforced, that nothing but the most obvious incapacity of body or mind, from natural or accidental causes, can procure exemption. Every conscript is examined by a local board of commissioners for military affairs, whose proceedings are reported to, and narrowly watched by a superior provincial board, and both report upon every claim to exemption to the War department. Such is the construction of these boards, that no favour or partiality can by any possibility be secretly shown without detection; nor can any local interest screen an individual from his turn for entering the army for three years, which is determined by lots, drawn by those who are between the prescribed ages stated above. Each conscript is appointed to a particular branch of the service, and to a certain regiment, regulated by his height, constitution, or previous occupation. Officers from each branch of the service attend the boards at their sittings, to make the selection. In some cases in which so long a service as three years would be destructive, or highly injurious to a person following a particular profession, the period is shortened to one year, upon a certificate of the facts being given, and the party finding his own

clothes and accoutrements. Such instances, however, are very rare and exceptional, and cannot be claimed as a right, being wholly at the discretion of the higher authorities.

After the three years have passed, and the conscript has completed his service in the army, he returns home on leave of absence, not absolutely as a civilian, but as supernumerary, liable to join his regiment again in case of a war. On reaching his twenty-sixth year, he is discharged from the standing army, and is then attached to the army of reserve, or that division of it called *erster auf gabeln*, or "first for service." This is considered the real army of the country, being composed entirely of soldiers of three years' training, and between the ages of twenty-six and thirty-two years. One-third of the standing army is discharged every autumn into this division of the army of reserve, and replaced in spring out of the population, by the local and provincial boards of commissioners. The army of reserve is called out for exercise in field manoeuvres for fourteen days every year, which, however, is sometimes extended to four weeks. After the age of thirty-two, the conscript is turned over from this first to the second division of army of reserve. In case of war, this division will not take the field, but will do garrison duty, as being composed mostly of men of families, and advanced in life, and also half-invalids who have been found unfit to serve in severe duty. After his forty-ninth year, the conscript is turned over to the *Landsturm* or levy-en-masse, which is only mustered or exercised in its own locality, and will only be called out in case of actual invasion or domestic tumult. The whole land is thus one vast camp, the whole population one vast army; every man in every situation in life, and in every locality, is a drilled soldier, who knows his regiment, his company, his squad, his military place in it; and he appears under arms at his rendezvous for duty with as little delay or confusion, and as complete in all military appointments, as a soldier in any standing army quartered in cantonments.*

It is impossible to conceive of any national institution more directly subversive of industrial habits, or presenting greater obstructions to industrial progress, whether in commerce, manufacture, or agriculture, but particularly the last, than this law of the *Landwehr* in Prussia. Is it doubtful what must be the effect upon the interests of the country, to have the entire rural male population abstracted for three years from their industrial pursuits, just at that age too when labour itself is a pastime, and its instrument a toy in the hands of the workman? What too must necessarily be the effect on the character and habits of the majority of these youths, produced by their being incorporated with a standing army just at that period when the mind is most susceptible of impressions, and at which the life of a soldier, half spent in idleness and dissipation, and the other half in acquiring a taste for military life, is thus imperiously forced upon him for his whole existence? for such, in point of fact, is its real duration. Un-

* The above account is extracted from "Laing's Notes of a Traveller in Prussia," &c.

doubtedly, although necessity may compel the conscript during the intervals of his military service to work for his bread, the dissipation and desultory habits of the guard-house and the camp will cleave to him through life, renewed as they are by the subsequent military service. And independent of the time abstracted from the years of useful labour, his industrial habits are deteriorated by those acquired in his military career.

Nor does the mischief stop here, for this transformation of a whole people by a vast military organization into a nation of soldiers inevitably leads to the debasement of the national character. We have already stated that the Prussians possess no nationality in common, the kingdom being composed of various provinces, having different habits, sympathies, and interests, and that the military system adopted is an attempt to amalgamate and fuse them into one nation, by uniting them into one vast military brotherhood. The aggregative effect is undoubted; but at the same time, the means employed are the worst that could have been devised either for the safety of the crown or the well-being of the people: whilst the system fails in reality in the main object of its design. The Pole still remains a Pole, the Saxon a Saxon, &c. Each of the Prussian states, whether conquered or ceded, retains intact its nationality in spite of the general organization, and steadily refuses the desired fusion into one people.

The emancipation of the Prussian peasantry is therefore only a change of masters, effected by breaking up the ancient landed aristocracy, who were in a manner independent of the crown, and the substitution of a military aristocracy dependent upon, and under the absolute control of the crown; whilst the serfs have been constituted freeholders of the land formerly held by the aristocracy, on condition of surrendering to the crown their entire civil rights, and consenting to be thenceforth governed, controlled, and overlooked by functionaries created, maintained, and commanded by the crown. Instead of a baronial master, who, whilst standing between the serf and the sovereign, may be supposed to have had an interest in the welfare of his retainers, the latter are now under the constant surveillance of a set of officials, who have no other interest to look after than that of giving satisfaction to the Government which employs them.

So far, therefore, as any real nationalization is concerned, this military organization is a failure. The raw materials, if we may so express it, are amalgamated, but, like a rope of sand, have no social adhesion, no national sympathies in common to unite them. Composed of different, and, in some cases, hostile provinces and peoples, conquered or transferred without their consent, the state which holds them in subjection with the despotic grasp of a conqueror, has neither a claim to, nor a hold upon their gratitude or affections. "It is connected," says Laing, "with the people only by two ties, that of the military army with its officers, and that of the civil army with its functionaries. The material interests of the people, even amongst themselves, are not amalgamated. There are no common interests,

common laws, common religion, common voice in the Legislature for their common centre, uniting all."

But it is with the bearing and effect of this military system upon agriculture that we have to do, and we therefore shall now proceed to describe it. In the year 1825, Mr. Jacob was deputed by the British Government to visit the Continent for the purpose of ascertaining the state of agriculture in the corn-exporting countries. The system of the subdivision of the land in Prussia had then been in operation eighteen years, so that a fair judgment might be formed of the effect both upon the character of the people and on the productive powers of the soil. This would undoubtedly have been ascertained, had not the system pursued by the Government, which we have described, neutralized the benefits supposed to be conferred upon the rural population by emancipation from serfdom. This renders it difficult to judge, except by analogy, how far the low and backward state of agriculture in Prussia is due to the system of small proprietaries, and how far to the additional and obstructive causes we have been describing.

At the period of Mr. Jacob's visit there were in Prussia 314,533 estates under fifty acres, and 257,347 of from fifty to two hundred and fifty acres. There were also 668,400 male adult Prussians, some of whom had each a small house of his own; whilst the remainder of the peasantry were labourers for others, and did not possess a house or any land of their own, but were allowed by their masters a field for the support of one or two cows. Mr. Jacob states that the poorest young man, if he is intelligent, prudent, and self-denying, may purchase a garden or farm for himself.

Mr. Jacob's report does not go into the question of large or small farming, but is very explicit in his account of the condition of the agricultural population in general. With regard to the peasantry, whether those who farm their own property or those who live as labourers for others, they have no counterpart in any class in England. Their dwellings are constructed of boards, or stones put together without cement, and are covered with shingles; their food is potatoes and rye or buckwheat; their clothing they manufacture themselves, the linen from flax grown on their own patches of land, and woollens from the produce of their own sheep. An earthen pot that will bear the fire is the most important article of furniture. The honey produced by their bees serves as a substitute for sugar; chicory, grown on their own land, for coffee. Wood abounds everywhere for fuel, and is burnt in close stoves. Water is the only general beverage, their finances not allowing them either ardent spirits or beer, except on extraordinary occasions.

The Prussia Crown possessed large landed property, which was let out in extensive farms at rents ranging from eightpence to four shillings per acre. Those Crown tenants do not appear to have been in much better circumstances than the small freeholders. Mr. Jacob states that they had run in arrears of rent for ten years; when the Crown, finding that they were unable to pay the back claims, consented to waive them, on condition that the rent should be paid in future. They agreed to

do this, but he further states that they had not been able to fulfil the engagement.

Under such depressing circumstances, the cultivation of the land was of a very rude description. Notwithstanding the system of fallowing every third year, losing thereby an entire harvest in that period, the produce was very small. The following is given as the amount of the cereal crops in Pomerania:—

	Wheat sown	Bushels. 185,935	produced	Bushels. 996,224
	Rye	1,254,960	"	4,383,584
	Barley	619,992	"	2,757,688
	Oats	1,245,704	"	2,975,880
Total...	3,276,590		11,113,376	

This gives a yield of 3-39ths of the seed sown of all kinds of cereals taken together. The value of land at that period in Prussia was very low. Mr. Jacob mentions a farm of 2,800 acres of good sandy loam, chiefly arable, which was sold during the time he was in the country for £5,300, or not quite 40s. per acre. Another farm of 4,200 acres of inferior quality had been mortgaged for £3,000. The mortgagee foreclosed, but upon the property being put up for sale it would not fetch the amount of the mortgage, and the creditor was obliged to take it. This cost him little more than 14s. per acre, and being a wealthy man he was able to expend £2,000 more upon it, and thus probably made it a more profitable concern than the previous owner had it in his power to do.

Such was the state of land in Prussia in 1825; since which time the system of subdivision has gone on rapidly without any change in the social or political condition of the country to relieve the peasant proprietors from the heavy tax upon their time and labour inflicted by the Landwehr.* The following was the distribution of the land in 1852:—

Farms under 4 acres	936,570; proportion	50:20
Ditto from 4 to 19 "	565,354 "	28:76
Ditto from 19 to 189 "	382,515 "	19:46
Ditto from 189 to 378 "	14,020 "	0:71
Ditto above 378 "	17,003 "	0:87
Total...	1,915,462	100:00

The above statement is taken from the official papers of the Board of Trade. It exhibits an increase of more than four-and-a-half to one since Mr. Jacob's time, in the number of farms under fifty acres, and of more than three-and-a-quarter to one of those under two hundred and fifty acres. The land is occupied in the following manner:—

* A striking example of the effect of this law occurred during the late war between the French and Austrians. The apprehensions entertained by the German States, that the contest would be extended to the banks of the Rhine, induced the Prussian Government to mobilize the Landwehr, or, in other words, to call out the whole of the male population, which was also done by the other States, members of the German Confederation. A friend of the writer's, residing at Bonn, described the effect upon industry as most destructive. "Commerce, manufactures, and agriculture were at a dead lock, and not hands enough were left in the rural districts to get in the harvest."

	Acres.
Gardens, vineyards, and orchards....	892,079
Under tillage	30,094,640
Meadows	5,266,419
Permanent pastures.....	5,419,192
Forests	13,614,564
Uncultivated	13,529,614
	68,816,538

The following was the entire produce of the principal crops in the year 1851:—

Wheat	3,674,663 qrs.
Rye	12,020,250 "
Barley	3,600,000 "
Oats	14,218,125 "
Potatoes.....	52,593,750 "
	86,106,788 "

It is evident from this latter table that wheat bread forms no part of the common food of the population. Mr. Jacob states that from the time he left the Netherlands, in passing through Saxony, Prussia, Poland, Austria, Bavaria, Wurtemberg, &c., until he entered France, he saw neither in the bakers' shops, in the hotels, nor in private houses, a loaf of wheat bread. The only form in which it could be purchased, was that of small rolls, and they were only seen when foreigners were at table. We believe that since that period it has come more into use amongst the wealthy classes; but still the domestic consumption is very small, the quantity grown as above stated not allowing more than 1½ bushel per head per annum. The wheat exported from Dantzic and other Prussian ports comes chiefly from the Polish provinces of Prussia and Russia, where the land is very good, and wheat is more extensively cultivated: rye bread is universally eaten by all classes, and with potatoes constitutes the only food of the lower classes, meat being a luxury beyond their means of purchasing. The following was the number of live stock in Prussia in 1849:—

Horses	1,575,471
Cattle	5,371,644
Sheep.....	16,296,928
Goats.....	554,771
Swine	2,466,316
Wool produced.....	35,852,343 lbs.

Between the years 1849 and 1852 there were brought into cultivation 2,768,880 acres of new land, and applied as follows:—

	Acres.
Gardens, vineyards, &c.....	68,228
Tillage.....	1,195,110
Permanent pasture.....	172,299
Forest planted	1,143,176
Meadow	170,067
	2,748,880

The following is an approximate estimate of the distribution of the land into farms, exclusive of the forests:—

936,570 farms, averaging 2½ acres ..	2,341,425 acres.
565,354 " 10 " ..	5,653,540 "
382,515 " 60 " ..	22,950,900 "
14,020 " 250 " ..	3,505,000 "
17,003 " 500 " ..	8,501,500 "
	42,952,365 "

The above is sufficiently near to give the reader an

idea of the different grades of agriculturists, according to the extent of their holdings. The next table is important as exhibiting the proportion of cultivated land appropriated to cereal and green crops. It is proper to state that the cultivation of the Silesian beet root for the manufacture of sugar and for distilling purposes is extensively practised in Prussia. In 1853 the quantity grown and consumed by the sugar factories alone amounted to nearly one million tons, which, reckoning the produce at ten tons per acre, occupies an extent of 100,000 acres. The potatoes may be reckoned at twelve quarters, or three tons per acre, which, according to the produce stated above, will give an area under that root of 4,049,480 acres. The triennial fallow deducts one-third from the cultivable land, leaving 20,063,094 under crop. The entire produce of cereals amounts, in round numbers, to 33,500,000 qrs. If we estimate these at an average yield of $2\frac{1}{2}$ quarters per acre, we have an aggregate of 13,400,000 acres under cereal crops. The following therefore is the proximate disposition of the arable land actually under cultivation:—

	Acres.
Wheat, barley, rye, and oats	13,400,000
Potatoes	4,049,480
Silesian beet root	100,000
Other crops	2,513,614
	<hr/> 20,063,094

The above estimate of the yield of cereal crops appears small; but when, in addition to the backward state of agriculture, and the general poverty of the farmers, we add that the land of most part of Prussia proper is light and sandy, and that it is subject to severe droughts in the spring and summer months, it will not be considered that we have underrated the produce. The most fertile and the best cultivated parts of the kingdom are the Rhenish provinces. A recent estimate made of the cereal crops in that district raises the average yield to 33 bushels per acre, as follows:—

Wheat	26	bushels per acre.
Rye	26	"
Barley	35	"
Oats	48	"
	<hr/> 4) 186	"
	<hr/> 33 $\frac{1}{2}$	"

This, however, is an exceptional result, and must not be taken to represent any other part of the kingdom. There is no doubt that the high price of agricultural produce for some years since 1852, and the admission of corn into the United Kingdom at a nominal duty, has given a stimulus to agriculture in Prussia as well as in other maritime States of Europe. The Prussian Government has instituted agricultural societies on the same plan as those in England and France, by which the improvement of the breeds of cattle, sheep, and other animals have been particularly attended to. But the increase of small farms, and the poverty of the peasant proprietors, coupled with ignorance, and an obstinate adherence to traditional husbandry; and overwhelmingly above all, those political institutions which

tax so heavily the industry whilst they deteriorate in all important particulars the moral character of the population, present insuperable obstacles to progress in agriculture, as well as every other industrial pursuit.

Nothing can demonstrate the effect of the *landwehr* upon agriculture more forcibly than the fact that the land is chiefly cultivated by the women and girls, and that very few men are to be seen in the fields. The women perform every operation of husbandry, even to digging the land, the most laborious part, whilst the men are engaged either in their military duties, or idling away their time with their comrades of the regiment. The account given by Mr. Jacob of the condition of the peasantry is confirmed by Laing at a more recent period. Without capital or agricultural knowledge, and having no remunerative labour on which to employ their spare time, the peasant proprietors have no means of improving their condition. Everything, in fact, in social life, is stereotyped under the centralized power and authority of the Government, which commences its training from earliest childhood. To the national school every parent is compelled to send his children, under pain of fine or imprisonment if he neglects it. At these schools the paramount duty of submission to the authorities is sedulously inculcated. All instruction is imparted with the most rigid adherence to the system laid down by the law, which embraces everything except the art of thinking for themselves. This task the Government takes off their hands, by thinking for them; and the ideas of the children are directed into the prescribed channel, from which they are not allowed to diverge. Thus primary education itself, which ought to be a preparatory enlargement of the mind, to become in after-life the foundation of that higher and more serious education, the tendencies and results of which depend upon the bias previously received, is converted into a State engine for the purpose of rendering the people the passive instruments of despotism. The effect of thus degrading the human mind by repressing even the ideas, if possible, of that which alone constitutes a man—liberty of thought, speech, and action—is seen amongst every class in the country. "Did it ever happen to a traveller," says Laing, "taking a walk in the neighbourhood of Oxford, Cambridge, Dublin, Edinburgh, Glasgow, Aberdeen, St. Andrews, or any of the Universities of the United States, to be accosted by a stout, able-bodied, well-enough-dressed student, begging cap-in-hand for money from the passengers on the high road? Ten thousand to one, no man alive ever witnessed such debasement of mind amongst the youth of those countries, educated or uneducated. The lad would sell his clothes, work, enlist, starve, drown, hang; but beg he would not. In Germany, within half-a-mile of the University of Bonn, on a Sunday evening, when all the town was walking abroad, I have seen a student in tolerably good clothes, with tobacco-pipe in his mouth, begging, with his hat off, in the public road, running after passengers and carriages, soliciting charity, and looking very sulky when refused; and the young man in full health, and with clothes on his back that would sell for enough to keep him for a week.

This is no uncommon occurrence on the German roads. This want of sensibility to shame or public opinion, or personal moral dignity, is a defect of character

produced entirely by a system of Governmental interference in all education and all human actions. It is an example of its moral working on society."

WHEAT GROWING IN CANADA.

It has long been a generally received opinion, that by far the largest portion of Upper Canada is, from soil and climate, peculiarly adapted to the production of wheat, particularly the winter varieties. The Genesee country in the neighbouring State of New York has, till recently, been highly distinguished for the abundance and superior quality of its wheat; and we have in our own western peninsula a wide tract of land, extending to the shores of Lake Huron, comprising similar soils, and resting upon the extension of the same geological formations as prevail in western New York. In the centre and west of that State, wheat culture of late years has been gradually contracted; and in some formerly favoured districts, which used to produce thirty bushels and upwards per acre, this crop has been almost entirely abandoned. Judging from results of the last few seasons, we are in a fair way of following the example. The evil has been gradually, and therefore to some, perhaps, almost unobservedly coming upon us, till of late the crop has been reduced in amount from thirty to forty per cent. below the ordinary average of former years. The yield of last season, as shown some months ago, in the able report on the subject by the painstaking and efficient Secretary of the Bureau of Agriculture and Statistics, was extremely deficient; and this circumstance, coming in the wake of a commercial panic, almost unparalleled for its sudden and widespread desolation, is sufficient to account for our present depressed and embarrassed condition.

Without attempting, at present, an analysis of this complex and difficult subject, which has already engaged the serious attention of many of the best statesmen, agriculturists, and men of science on this continent, we may observe that the two chief proximate causes of the failure in wheat have been the midge and rust. These evils have not taken us by surprise, but have been coming on by degrees, in some seasons more marked than in others, yet, upon the whole, progressively increasing in the extent and intensity of their effects. In the absence of any reliable specific, which the most rigid investigators have hitherto been unable to discover, we may be permitted to offer a few plain and practical suggestions in the hope rather of mitigating than of effecting an immediate removal of the evil, the latter being, we fear, at present far beyond the reach of human agency.

And first, when we properly consider the extremely imperfect manner in which land is generally prepared for wheat, and the short intervals allowed between the same kind of crops, a certain deterioration both in quantity and quality is a result that might naturally be expected. We have been persevering in the practice of extracting, by incessant grain crops of a near affinity, those various constituents, without a certain proportionate amount of which no soil can be fertile, or profitably cultivated. As rich, virgin soils are commonly found to yield a succession of bountiful crops under a rude and imperfect culture, farmers unwisely and, perhaps, unconsciously, have been induced to persist in the system till they discovered, to their cost, that their land refused its wonted returns. Shallow and imper-

fect ploughing, with an occasional scratching of the surface and covering the seed by the harrow, in the rudest manner, have too generally been considered sufficient for the mechanical preparation of the seed bed. And in addition to all this, land is too commonly kept in grain crop, without often any kind of manure, till it refuses to yield a profitable return.

Secondly—Land intended for wheat should not only be naturally adapted to the plant, and receive a deep and thorough cultivation, when necessary a proper manuring, but it must also be sound and dry. This latter condition is the one most essential, in the absence of which manures and the most perfect cultivation will be, to a great extent, thrown away. In wet lands, however rich they may be in all the elements of fertility, draining is an essential preliminary to the profitable raising of grain, especially wheat. If this simple condition were obtained, we should hear comparatively little complaint of rust, winter-killing, &c. A wet soil is always cold and late, the opposite of which, viz., warm and early, are of the greatest consequence in wheat culture.

Thirdly—The judicious selection of such varieties of wheat as are suited to particular soils and climate, with an occasional change of seed and strict attention to its purity and uniformity of ripening, are matters which demand special attention. As a general rule, early sowing, leaving the precise time to be determined by the character of the season, the mechanical and chemical condition of the soil, and local circumstances, is a consideration of by no means secondary importance. If the land be very light and porous, the application of a heavy roller would be beneficial; and sowing with the drill, when practicable, is always to be preferred. The seed is in this way more regularly deposited and evenly covered, thereby securing a greater uniformity in germination, growth, and ripening, and rendering the young plant far more secure against the effects or, as it is termed, "heaving out," by the alternations of freezing and thawing in early spring.

We would by no means insinuate that these few, but, as they appear to us, most important precautions, would in all situations, and in all seasons, render our wheat crops invulnerable and certain, especially against that now too common and most destructive pest, the midge. But we only utter the words of truth and soberness, as the most careful observation and enlightened experience testify, when we say that natural unsuitability of soil and climate, both of which may frequently be modified by art, want of drainage, sowing wheat too rapidly in succession, or otherwise over-cropping, too late sowing, with imperfect cultivation, and impure, or inferior dirty seed, are the chief and often the only causes of producing a sickly wheat plant (and indeed of whatever other crop that may be cultivated), thereby rendering it peculiarly fitted to be afflicted by the midge, or any other species of blight in the numerous catalogue of disasters which afflict our grain crops.

If the ravages of insects, rust, &c., should unfortunately

prove too powerful against the spirit of these and similar suggestions when faithfully applied, which we certainly do not believe would be generally the case, no other alternative seems to remain but the total abandonment of wheat growing for, at least, a few years. This extreme expedient, to which farmers will always most reluctantly resort, was actually carried out some years since in the Lower Province, in the Eastern States, and more recently in some sections of the adjoining state of New York, and the ultimate results have unquestionably been beneficial. We are in a much better position now to forego, if we should really come to that, the raising of wheat, than we should have been only a few years since, when that article was almost the only one for which the farmer could readily obtain cash. It is not so now. Notwithstanding the serious loss and inconvenience which Canada would experience by being deprived of her usual wheat crop, for which hitherto our soil and climate have proved so highly favourable, still we must not despond, as the growing of wheat does not comprehend the whole of our agriculture. Spring grains, and especially the breeding, rearing, and fattening of improved breeds of live stock, could be beneficially made to occupy a more prominent and profitable position than has hitherto been the case, and in the course of a few years the soil would be refreshed for the growth of wheat, under new and more favourable circumstances.

But to this extreme alternative we hope and believe that there is no necessity to go. A vigorous and systematic effort to avert the present threatening destruction of our hitherto staple crop, must be unitedly and immediately made. The evil is already in our midst, and is seriously impairing both the agricultural and commercial well being of the country. We earnestly entreat our farmers to confine their wheat culture to naturally suitable soils, and to increase that suitability by all the appliances of improved systems of husbandry they can command. Of wheat, and perhaps some other kinds of grain, for a while, at least, cultivate less and cultivate better. Land exhausted by too frequently recurring grain crops, when properly laid down to pasture, will become gradually enriched and restored by the grazing of cattle and sheep, which can now be made a profitable branch of husbandry. Hemp and flax, and probably some other crops not yet tried, might be advantageously introduced. We earnestly invite communications from such of our readers, in different parts of the Province, as may have any information or suggestions to offer on this very important and engrossing subject. There never was a time in the history of our yet but incipient agriculture, when careful thought and observation, united with energetic and combined action, were more urgently required than at the present juncture.—*Canadian Agriculturist*.

THE STEAM CULTIVATOR AT CROWNEAST.

Recently we walked over to Crowneast, the estate of A. H. Rhoyds, Esq., to witness the action of a new steam cultivator, and the apparatus for giving it motion. We found the instrument in operation in a large field at the rear of the Sand-pits Inn, situated about two miles from this city, on the Bromyard-road. The cultivator was travelling at the rate of about three miles and a half per hour across the field, and the machinery appeared to be doing its work easily, without strain or extraordinary effort. The field was one of thirty-six acres, divided into two nearly equal parts by iron ox-hurdles. The soil was apparently a strong loam, and mixed with more gravel than is usually seen in land of this description. It appeared to be shallow and of middling quality. The field had been recently thoroughly drained, and the soil was tolerably dry and friable. It had been scarified some time back, but had settled down pretty solidly, and wheels passing over it made little impression upon it. The apparatus consisted of—

1. A steam engine.
2. A cultivator.
3. A windlass.
4. Two travelling anchors or crabs.
5. Two fixed anchors.
6. A mile of wire rope.
7. Friction pulleys to carry the rope.
8. A water cart.
9. A coal cart.

The engine is one of ten-horse power, and, at the first glance, resembles one of the portable engines which travel from farm to farm with thrashing machines. A nearer inspection, however, shows that it is highly superior to most of those engines in construction and finish, and possesses some peculiarity of arrangement in its component details. Like all engines of its class, it is of high pressure, and ordinarily works at an average of about 50lbs. on the inch,

though the boiler is calculated to withstand many times that force. The cylinder is placed horizontally on one side of the engine, and the driving-wheel (which is also the fly-wheel) on the other, but at different ends of the engine. The shaft carrying this wheel passes through the smoke-box at the end of the engine, and reappears on the opposite side, as a crank. The crank and the cylinder are therefore both on the same side, but at different ends of the engine. The piston-rod is fitted with the usual guides, and the distance between the cross-head of the rod and the crank being very considerable, the connecting rod is long, and this is very favourable to easy action on the crank, and to the endurance of the slide and brasses. The cylinder has a ten-inch bore, and the piston an eighteen-inch stroke. The slide valves lie on the top of the cylinder, and are worked in the ordinary manner by an eccentric on the crank shaft. The pump for supplying the boiler has its ram connected with the cross-head or the piston, and the ram in consequence makes an equal stroke in length with that of the piston. Advantage is taken of the length of the stroke to lessen the thickness of the ram, in order to reduce the friction. The governor communicates with an equilibrium valve for regulating the supply of steam; and as this sort of valve requires but little force to work it, the governor has unfailing control over it, and the amount of force required for the work is measured out in the most delicate and regular manner. If the cultivator meets with obstacles which retard its progress, the effect is at once communicated to the engine, and the equilibrium valve allows more steam to pass into the cylinder. If but little resistance is made to the progress of the cultivator, the steam is instantly partially cut off by the valve, and the power of the engine for the moment lessened. The equilibrium valve is no new invention, but is not usually,

we believe, put upon portable engines. A lubricatory apparatus lies above the stuffing-box of the cylinder, and measures off a minute quantity of oil at each stroke of the piston to lubricate the piston and keep its friction at a minimum. The boiler is remarkably strong in construction, and has five seven-inch Birmingham tubes, which are riveted to the ends by means of angle-iron. It has also a man-hole large enough to admit of access to the interior, for the purpose of cleaning it or doing repairs. This is unusual in these tubular boilers, but is a useful arrangement. The boiler is enclosed in a neat sheet-iron case, the space between the boiler and casing being packed with felt, to prevent the radiation of heat. The crank shaft of the engine lies across the smoke-box, as we have before stated, but it is cased in from the action of the heated air. Below it is placed an "extractor," a copper vessel communicating with the boiler, and receiving the cold water, from without, intended to supply the boiler. The exhausted steam, after leaving the cylinder, is conducted in a thin walled tube through the heart of this reservoir; and the heated air, after it has passed the tubes, impinges upon the outside of the reservoir, so that the water, before reaching the boiler, has arrived at the boiling point, and as much of the heat as can possibly be extracted from the steam and smoke is thus usefully economised. The engine is kept steady by iron shoes, which are fitted to the wheels, and keep them from sinking into the ground whilst the machinery is in motion. The general appearance of the engine is good, and, through the comparatively low situation of the working parts and the disposition of the weight, it is very steady when in operation. The cross-head and slides of the piston are cased in from the dust, but, like every other part of the machine, are easy of access. A labourer may in a few days learn to manage it. The finish is much better than that of agricultural engines made for cheapness, and appears to be quite equal to that of a railway locomotive. It weighs about five tons. Its consumption of fuel is about the same as in any good engine with a similar amount of boiler space exposed to the fire. Of course this engine is not a necessary portion of the apparatus. Any other engine of equal power can be used.

We next come to the windlass, which is placed at such a convenient distance from the engine as to be put in action by means of a strap. The windlass resembles a low, broad, strong waggon on four wheels, one of which is kept steady by iron shoes. It contains two iron drums, three feet six in diameter, which carry wire ropes. In front of these drums an iron shaft lies across the waggon, and this shaft is set in motion by means of a large driving wheel at its extremity, impelled by the strap from the engine. The shaft carries gearing, which can set either drum in motion at the pleasure of the man in charge of the machine. Whilst one drum is winding up a wire rope, the other is paying out a wire rope; and when a contrary action of the cultivator is required, the machinery is reversed, and the drum which gave out rope begins to rewind it, and the other, which was winding on, gives rope off. The coupling-box usually employed for reversing the action of a machine is here discarded, simply because it is rather too effective and uncompromising in its action. When the coupler has once laid hold of the pinion which it is to turn, it never yields its hold till shifted by the attendant. No impediment to the working of the machinery can shake it off. This quality is useful while the work goes regularly on, without meeting with obstacles calculated to bring the machinery to a stand; but something else is needed where a

cultivator or a plough may meet with a stone or a stump, and be brought to a dead stop. In case such an accident occurred, the result would be the disappearance of the teeth of a wheel, the breaking of a shaft, or the upsetting of one of the machines, if no provision were made for allowing the engine to work on when the rest of the apparatus is brought to a sudden stop. Mr. Royds uses a "friction-box" for conveying the motion from the shaft to the drums. This operates by the friction and pressure of one disk upon another, instead of teeth, the pressure being regulated to a nicety by a lever and screw. The turning of one disk necessitates the turning of that against which it presses; but if the cultivator meets with a sudden obstruction, the drum instantly ceases its action, the pressure on the friction-disks being not sufficient to keep up the winding when any very large strain occurs; and the engine, meanwhile, keeps on its accustomed rate till stopped by the driver. When either drum is giving out its rope, the speed is regulated by a break and a weighted lever.

Before describing the remainder of the apparatus it will be necessary to speak of the mode in which the process of disturbing the soil by the cultivator is carried on. We will take for illustration a small field rectangular in figure. The engine would be placed on a headland near one corner, say on the north side, with the windlass-waggon in line with it on the headland. Lying flat on the ground near the windlass is a large pulley, and there is a pulley in each of the other corners of the field. The wire rope would pass from the windlass round the pulley near it and then down the east side of the land to the opposite corner, then would be turned round a pulley and pass along the south side to the next corner, where it would be taken round the third pulley and fixed to the cultivator on the west. Then a rope would be brought from the windlass along the north side of the field till it reached the pulley at the corner, round which it would pass and be conveyed down the west side of the enclosure to the cultivator, to which it is attached at the opposite end to that on which the first cord was fastened. It will be seen that if the windlass pulls the second rope the cultivator travels up the west side from south to north, and if the other rope is drawn, the cultivator goes back from north to south. The pulleys nearest the cultivator are moveable, so that when the instrument has travelled one length of the field nearest the hedge, the pulleys are shifted a little further east, so that the cultivator encounters fresh ground each time, working from north to south, but gradually shifting till it comes to the eastern fence, and all the field has then been stirred except the headlands.

The portable pulleys are fitted to frames constructed like little waggons on four low wheels, each of which has a sharp, deep, and curiously constructed flange to take firm hold of the earth. Each waggon is also filled with machinery, which, put in motion by the action of the unwinding rope on the pulley, advances the frame and pulley to any fixed distance along the headlands in order to bring them opposite to the new line of ground to be operated upon by the cultivator.

The "rope porters" are small pulleys mounted on small wheels, and are planted along the land to keep the rope from dragging along the soil. When the cultivator approaches one of them, a boy pulls it out of the way, and returns it when the implement has passed.

The rope is made of fine steel wires stranded together, and is about six-eighths of an inch in diameter. A mile of it weighs about one ton. It is exceedingly strong and flexible.

The cultivator contains ten strong tines, five of which

work when the instrument goes in one direction, and five when it goes in the opposite direction. As in other cultivators, the tines are capable of adjustment at any required depth. It is four feet six inches from one outer tine to the other, and would of course cultivate a breadth of rather more than five feet at one time. The tines not in use require no lifting, but simply slide backwards on the surface of the soil. There is a seat at each end of the machine for the man in charge of the machine, which is guided by a small steering wheel at each end with great nicety. A railway signal on the cultivator indicates to the distant engineman how to manage his engine.

The weight of the engine, machinery, ropes, and pulleys is about 15 tons.

Under ordinary circumstances the apparatus requires about two hours to fix and bring into operation. Under favourable circumstances the cultivator will turn up seven or eight acres in a day of ten hours, doing the work twice over. On Saturday last the machine scarified, twice over, a space of 800 yards by 14 yards in one hour. This is something less than an acre. In the trials on Saturday and on Monday the machine broke about two feet six inches of new ground each journey along the land, and at the same time passed over about two feet six inches of land which it had just scarified. By this means the land was disturbed twice before the implement left it. The work appeared to be nicely done; the weeds and grass lay on the surface, and the soil was finely broken up. The tines disturb the earth to a depth of about ten inches. The field being large, arrangements had been made for cultivating about a half of it before the engine would require moving.

Besides the usual attendant on the engine, a man is required at the windlass, a boy at each of the two travelling anchors, and a youth or two to shift the "rope porters" out of the way of the cultivator as it moves up and down the land.

The apparatus is from the workshops of Messrs. Barnish and Ratcliffe, of Rochdale, who are locally well known for the excellence of their machinery. It is only of late that they have turned their attention to the manufacture of steam engines and machinery of this character, but the excellent workmanship displayed in Mr. Royds's apparatus shows that the firm is capable of turning out work of a fine quality. The operations at Crowneast are under the superintendence of Mr. Barnish, whose ready intelligence and practical skill qualify him strongly for carrying out the ideas of an inventor. Mr. Royds appears to be determined to spare neither expense nor trouble in bringing the apparatus to perfection, and he could not be seconded by a man more ready to catch a suggestion and more skilful to embody an idea in iron and wood than Mr. Barnish.

We are invited by Mr. Pitt, the active and intelligent bailiff at Crowneast, to look over Mr. Royd's farm, and gladly accepted the invitation. We passed by the lodge, and entered the pleasant drive leading to the mansion. We were told that great alterations and additions had been made to the buildings during the three years which have elapsed since the estate was purchased from W. S. P. Hughes, Esq., by Mr. Royds. The building is irregular in style, and might be called "the house of many gables." It appears to be roomy and comfortable, and every way fitted up for a rural retreat from the cares of business. The grounds about are very neatly kept. We could not help remarking the large employment of painted iron hurdles in place of hedges, both here and in various parts of the farm. These, though costly, are lasting, take up no room on the

land, harbour no destructive vermin, and neither obstruct the sun nor the air.

The farm buildings are placed at some little distance from the mansion. After being hospitably entertained by Mr. and Mrs. Pitt, at their house, we set out on our journey round the farm premises. First we looked at Mr. Pitt's pet fox, which is chained in his back-yard. This animal is a handsome male, with light coloured fur. His kennel is like that of a dog, but larger, and he delights to be on the top of it. "Is he tame enough to be handled?" we asked. "No," said Mr. Pitt, "he would bite me if I touched him. He was formerly on very good terms with Lassie, here, (a handsome sheep dog) but they quarrelled one night and fought. The fox got the worst of it, and now keeps out of her way. He was taken as a cub, but was allowed to run about too long to be tame." He drove the fox down from his elevated position with a paddle, and the wily animal hastily disappeared into his kennel. We had scarcely left the yard before he had returned to his elevated post.

The extensive rick-yard was completely filled with ricks, beautifully shaped and neatly thatched. The yard was gravelled and dry, and not a stray straw was to be seen about it. In one building we saw a stationary high-pressure steam-engine, of about four-horse power, which is incessantly going, during working hours, all the year round. This engine, with an eight-horse boiler, grinds corn for the horses, cattle, and pigs, pulps turnips and swedes, cuts chaff, churns the cream, pumps the water for the establishment, throws liquid-manure to the top of a neighbouring hill, drives a cider mill, and performs nearly all the heavy drudgery of the homestead. By the vapour from the boiler roots and corn are boiled and hay steamed in iron vessels, everything being conveniently arranged for forwarding the work. The dairy is a cool place at the corner of the rick-yard, with a floor sunk a couple of feet below the surface of the neighbouring land. The building looks like a barn on the exterior, but it is pretty well lighted from the roof. The interior is divided into two portions, in the first of which is the churn, with the machinery to connect it with the steam-engine; then there are cheese-presses and the usual implements of the dairy. The second compartment, which is parted from the first by glass, contains tables on which were set the dishes containing the milk. Here were no Dutch or white tiles on the walls, no encaustic patterns on the floor, nor any attempt at ornament. The place was, however, scrupulously neat and clean, and deliciously cool and fresh. The cream was mantling on the surface of the milk in the earthenware dishes, and all was neatness and order. There is a long cow-house constructed out of a stable, capable of accommodating many animals, with broad passages behind and in front of the stalls to allow of ready feeding and cleaning. The place is pleasantly ventilated, and is lighted by glass in the roof. The stable (constructed out of a large barn) is also admirably adapted for its purpose, and fitted with everything necessary for use, and little for show. We were also shown loose boxes for weaned colts, &c., the granary, the cider mill, and cellar, the smithy, the carpenter's shed, the stables for the carriage horses and nags, and the harness-room, all of which were kept in most excellent order.

Amongst other improvements on the estate are new houses of pretty construction and comfortable accommodation for the bailiff, the gardener, and the labourers. The rents charged are very moderate. In the rear of the mansion, with an approach through the grounds, Miss Royds, the only daughter of Mr. Royds, has established a school for the children on the estate, both boys and girls. The school-mistress is the daughter of the gardener, who is frequently assisted by Miss

Royds in the duties of the school. The education is of a useful character. About a dozen healthy and clean-looking youngsters of both sexes were under instruction at the time of our visit. These, however, were only part of the scholars. We noticed that a harmonium was located in the school. The children are educated gratuitously.

The estate consists of about five hundred acres, a portion of which is kept in grass. The milch cows, about twenty in number, are all shorthorns of pure breed, and we noticed a couple of shorthorn bulls, of fine character, at the cow-house. But we noticed that some Hereford cattle, of very pure blood, were also kept. On the face of a hill not far from the home-stand, Mr. Pitt pointed out the excellent effect produced by liquid-manure on the herbage. The spot at one time was almost barren, but the liquid-manure, conveyed to it by a subterranean pipe, had covered it with rich grass. We also noticed in one of the pastures a flock of about a hundred Shropshire downs of remarkably even quality.

Attention to time being one of the elements of success in farming as well as in commercial and manufacturing operations, Mr. Royds has had an expensive turret-clock put above the stabling. The bell on which it strikes is about as large as the treble bell in a respectable church-tower.

Through the steam-engine performing so much of the work at the home-stand, fewer people are seen about the place than is usual where the farm is of large dimensions, yet more labourers are regularly employed upon the estate than ever were

kept upon it before, and their condition is no doubt vastly improved. We may here state that amongst other contrivances for their welfare, Mr. Royds has established a clothing-club, to which the labourers and their wives contribute sixpence per week each. At the end of the year this is increased by one-half out of Mr. Royd's own pocket.

The reaping-machine was employed throughout the harvest at Crowneast. All the wheat, beans, and barley were cut by it. Mr. Pitt's report of the machine, which is one of Burgess and Key's, was that it performed its work very satisfactorily, even under the unfavourable circumstances of the late season. Where the corn stood tolerably erect the implement left a beautiful stubble; where the crop had been lodged the cutting was passably done, but the stubble did not look well. In respect to the economy of the machine, the cost of cutting was decidedly under what it would have been if done by hand, but great advantage was derived from the facility which it gave for harvesting the crops in doubtful weather.

Notwithstanding the evidences which abound at Crowneast of farming on a high scale, we believe that the attention of the proprietor is far from being confined wholly to agricultural pursuits. Mr. Royds is better known in Lancashire as a banker and extensive colliery owner than as a farmer, but it is probable that the same energy, intelligence, and perseverance which he has displayed in Worcestershire would ensure success in any occupation or in any place.—Worcester Chronicle.

BLOFIELD AND WALSHAM AGRICULTURAL SOCIETY.

This Society celebrated its anniversary on Friday, Oct. 14, at Blofield. The day was delightfully fine, and the autumnal tint which the country has assumed seemed to enhance, if possible, the beauty of this attractive part of Norfolk. The land in the neighbourhood of Blofield is exceedingly good, and, in some cases, it is understood that farms have risen to £3 per acre—a pretty significant test of their value. The show of stock took place in a field at the back of the Globe Inn; but the display, considering the extent and resources of the district, was far from what it might have been, being, in fact, meagre. The horse stock shown, however, were very fair, the colts particularly so; and there were also some nice heifers on the ground, and a few fine Highland cattle. The exhibition of sheep and pigs was quite insignificant as to quantity, and called for no particular remarks. The judges, Messrs. Burton, Garrett, and Kidman, declined, in several classes, to make any award of prizes, on the ground of insufficient merit or inadequate entries. The farmers of the neighbourhood appear, in fact, disinclined to go to the expense of sending stock for exhibition, when they know that the magnates of the locality intend also to be exhibitors; and this state of things obtains in many other agricultural societies; indeed, it is a serious obstacle to their thoroughly efficient working. The farmer feels that in nine cases out of ten he has no chance against the unlimited resources of the large proprietors, and consequently he declines to stand forward only to be vanquished. No doubt a great exceptional excellence is attained in breeding, under the present system, and much advantage indirectly accrues in consequence to all classes; but the ordinary farmer prefers to stand aloof from what he feels would be to him a vain and profitless competition. This was the case at Blofield, on Friday;

but the judges had, of course, to determine "on things as they found them;" and their awards were made as follows: For the best fat steer or heifer, £2, Mr. T. G. Tuck; for the best steer or heifer, £2, Mr. T. W. Gilbert; for the best steer or heifer for grazing, under three years old, £2, Mr. T. G. Tuck; second prize in this class not awarded. Prize of £2 for the best stock bull, not awarded; for the second best ditto, 10s., Mr. Rose. Prizes offered for the best agricultural stallion, not awarded. Prize for the best tap of any breed, not awarded. For the best pen of five shearing sheep of any breed, a prize of £1 10s., and second prize of 10s., Mr. Jary. For the best agricultural mare, first prize £2, second prize of 10s., Mr. H. N. Burroughes. For the best cow, £2, Mr. J. Kerrison; second, 10s., Mr. Rose. For the best in-calf heifer, £1 10s., Mr. Jary; second best, 10s., Mr. Kerrison. For the best pen of breeding ewes, £2, Mr. H. N. Burroughes; second best, 10s., Mr. T. W. Gilbert. For the best pen of lambs, £1 10s., Mr. Jary; second best, 10s., Mr. T. W. Gilbert. No prizes awarded for pigs. For the best two-year-old agricultural colt or filly, first prize of £1 10s., and second, 10s., Mr. R. Gillett. For the best year-old ditto, no prize awarded; second best, 10s., Mr. T. Gillett. For the best foal, £1, Mr. T. G. Tuck; and for the second best, 10s., Mr. R. Gillett. There was no competition in grain or roots, but some ploughing was well executed during the day in an adjoining field, and prizes were awarded to the best hands, and also to a number of other labourers.

In the evening the members of the Society dined together at the Globe Inn, under the Presidency of Mr. H. N. Burroughes, who was supported by Lord Sudeley, Mr. R. Palmer (late M.P. for Berkshire), Mr. E. Howes (M.P. for East Norfolk), and about fifty other gentlemen.

THE LONG SUTTON PLOUGHING MATCH.

There are few more thoroughly English scenes than a country ploughing-match on a hale genial autumn day. Never, perhaps, is rural life seen to more advantage, as never do the different classes of the district meet more becomingly together. Everyone has really an interest in what is going on. The squire, the clergyman, the farmer, all enter fully into the business of the occasion, while the very townspeople catch the excitement, and talk learnedly of drawing a furrow, making pretty work, and so forth. But the holiday has a charm even beyond this. The cotter's wife cannot resist the temptation of coming to see how her old man is getting on, and she is "certain sure" to be kept in good countenance. There is the parson's wife in a pony carriage, the young ladies from "the house" in their brother's dog-cart, and clever active Mrs. Wheatear trudging about from headland to headland, nearly as good a judge as those august personages, the judges themselves. Then there are the stewards, riding to and fro, each magnificently distinguished by the smartest of rosettes; the county member more than usually complacent and agreeable; with a bevy of John Ploughman's personal friends, every one of whom has his "pint" upon the performance. And in the presence of so goodly a company the many different pairs continue their allotted course up the field, at that sober, serious pace so congenial to the nature of the contest, the competitor only just exchanging a word or so with a horse or a neighbour, as he turns for another bout. "*Gee, Boxer!*" "*Gently, Dragon!*" or a doubtful shake of the head, and a half-smile accompanying the "*Can't say yet, sir,*" that stands in answer to a word or two of encouragement.

It would be hard to admit, as some authorities would occasionally have us, that such meetings as these are not susceptible of great good. For our own part, we believe that they are attended with immense benefit to those chiefly concerned, and that the proceedings are rarely without a lasting influence. A ploughing match, although the distinguishing title of such a gathering, is rarely confined to excellence of this kind. There are, commonly, premiums for many other descriptions of skilled labour, as well as for good conduct and long servitude. Complain as some critics may, the stubborn facts are still before us. Prizes of the character we have referred to are even yet on the increase, while in those districts where they have been any time in action the effect is plainly apparent. The people are better workmen, better servants, and better citizens. They live in more comfort, and with more mutual respect. Crime and intemperance proportionately decrease, and while one man feels he has a good name to keep, another knows he has a reputation to get.

The Long Sutton Agricultural Society has been

steadily realizing so happy a consummation. Unlike the majority of similar institutions, it has limited rather than increased the field of its operation. From a meeting embracing a show of cattle and implements, it has come to centre its strength on a ploughing-match. And, no question, this was wisely determined; for, saving a few flocks of Lincoln sheep, the district is by no means famous for stock. In fact, the Association has come to direct itself almost altogether to the encouragement of the labourer, and it does so with the now customary enlarged notions of what a ploughing match should be. To begin with, there are premiums in ploughing for farmers' sons, yearly servants, single men, boys, and one grand all-England open class. But beyond these there are rewards for shepherds, waggoners, hedgers, thatchers, and drillmen. Then, there is another series for servants, male and female, who have lived the longest time in the same place; for those who have brought up the largest families; for boys and girls who shall best acquit themselves in reading and writing; and for girls who excel in knitting, sewing, and shirt-making. In a third classification we come to the allotment, with a premium for a rood of land cultivated in the most profitable manner; and others for cottages and gardens which are the best managed. There is, no doubt, much that is objectionable here. Many of these incentives we shall be told, as we so often have been, are debasing in their influence and inquisitorial in their action. The labourers themselves really care little about them, and their effect, if any, is rather pernicious than otherwise. In the face of such criticism we must go to facts as we find them. There are few such associations, we think, better supported than that at Long Sutton. We mean, in saying this, there are few where the working people themselves enter more keenly into the competition offered them. Almost all the classes were well filled, and whether it was ploughing, hedging, or thatching, there was scarcely a farmer but had a man to enter. The result of such a continued system of rivalry, or, in other words, of *improvement*, must be surely self-evident. Then, again, the claimants in the long servitude, good conduct, and cottage-garden sections, were equally well represented; and all with this one great deduction. For years past the character of the district has been rising, and the Superintendent of the Police at Sutton left the other day, with the declaration that nowhere was there so little crime or even intemperance. Some will argue this may or may not be traceable to the influence of the Agricultural Society. We are quite ready to leave it an open question. But we have at the same time a very strong opinion of our own as to the actual utility of such a means.

Considered, however, more strictly as that it professes to be, and which would certainly be the chief attraction to the stranger, the Long Sutton "ploughing match" promises to take very high rank amongst such meetings. Indeed, the champion ploughing on Wednesday was generally pronounced to have been some of the very best ever seen. The ground, to be sure, was in capital condition for showing good work, and many of the men proved themselves quite worthy of the opportunity. More, perhaps, than usual interest was taken in the proceedings from the three great firms of the Howards, the Hornsby, and the Ransomes having entered for the premium. But the recent discussion had not here that "point" which was expected, as the Messrs. Hornsby did not make their appearance, and public opinion went very generally with the judges when they declared Ransome's to be the champion ploughing. The work of Mr. Howard's man was justly commended, and Yorkshire, Norfolk, and other implements received the customary comparison with the favourite swing plough of the county. Still the local performances were very inferior to that in the all-England class, making it a debatable matter whether the man or his tools were the more in fault. Notwithstanding the annual proof now afforded them, even the best farmers cling very strongly to their own sort, although some of their servants appear more open to conviction. On the day after the meeting, we were riding over a farm where one of the unsuccessful competitors was at work. In conversation, he expressed himself anything but satisfied with his defeat, maintaining he should have done as well as any of them with "one of them other ploughs." The "other," of course, meant the wheel-plough, while Will's master adhered to the home-made one.

As something of a zest for the employers themselves the society makes an offer for a few acres of the best roots, and the award over the mangold wurzel crop created a good deal of excitement. It went once more in favour of Mr. Hobson, who has all the credit of clean careful cultivation. We followed the judges in their round of inspection of the different farms on the day after the meeting, and, in the face of some considerable discussion, should have been quite prepared to go with them. Another great, if not the chief feature of the programme, was the offer of fifty pounds for the best application of steam-power to the cultivation of the soil, although this resulted in a comparative failure. In fact, the three entries in competition were all worked on much the same system—that is with different modifications of Smith's apparatus, but with different descriptions of engines. The most remarkable amongst the latter was Mr. Walker's locomotive, which this year did get into the field, but that we should fancy could never be relied on until furnished with the Boydell endless railway wheel. We gave a paper in another column on the trials of the steam engines, in which, however, the great point of a comparison was wanting. Indeed, it is a question whether, under the circumstances, the prize in fall should have been awarded.

Whatever the subject of steam-ploughing may have lacked in its illustration in the field, was amply made up for by the discussion at the dinner. We never remember one where the talk was more usefully directed to the real business of the day. Mr. Smith, of Woolstone, Mr. Romaine, and Mr. Walker were all present, as well as Mr. Dring, the tenant to whom the prize had been decreed. The judges also joined in, and a very animated, but well-regulated debate was the result. There may not have been much new matter in this, but it was in excellent time and place, and may do much to familiarize the system with those of the Messrs. Dring's neighbours, who have not yet advanced so far as themselves. Other as congenial topics were not forgotten; and Mr. Randall, for the agents of the landlords, particularly distinguished himself in upholding that kind of tenure for which Lincolnshire is so famous—where, in his own words, "Confidence has become a tenant's right, and tenant-right a custom." As a labourer's society the men had quite their share in the proceedings. After dining together, they entered in a body to receive their prizes, distributed in turn to them by Mr. Spencer Skelton, as Chairman, who laboured very zealously and successfully in discharging the really arduous duties of the office. He was well supported by Mr. Packe, one of the county Members; Mr. John Clarke, the Secretary of the Society; the Rector of the Parish; and the Corn-exchange as a dining-room quite full of agriculturists, and others as much interested in the occasion. There were, in short, few drawbacks to a day that we think it a duty to dwell upon. The Clergyman, to be sure, was singularly unfortunate in the style and taste of his address to the labourers; it could scarcely have been more injudicious. And the ceremony of crowning the champion ploughman with a new hat, encircled with fine flaunting ribbons, when he comes up to the table for his prize, might be advantageously dispensed with. It is such customs as these that bring the proceedings under hostile criticism, while the effect to the champion's own friends might be positively alarming. Their first conclusion on seeing him so bedecked would be that he had "listed."

THE STEAM PLOUGH PRIZE AT THE LONG SUTTON SHOW.

An effort has recently been attempted to make the public familiar at these meetings with the varied applications of steam-power to the cultivation of the land. Such a feature of these gatherings has been one of great attraction, and done much to increase their popularity. Inventors have not been backward to recognise this desire to do justice to their endeavours. Both Messrs. Fowler and Smith have exhibited their methods, and have met with great encouragement.

This year a special effort was made by the committee of the Long Sutton Society, and £50 was offered as a prize for the best application of steam power to the cultivation of the soil. Mr. Fowler was unable to com-

pete; Mr. Rickett's had not completed his engine; so that we had only three forms of Mr. Smith's apparatus. *They were all exhibited by tenant-farmers of the neighbourhood.*

Mr. T. B. Dring, of Gedney Marsh, received the £50 for the work done by what is called Chandler's application of Mr. Smith's principle. The improvement consists in the windlass being combined with the engine, and driven by cog-gear direct from the fly-wheel shaft, by which arrangement the strap is dispensed with, and with it many hindrances that arise in wet and windy weather, when the engine and windlass are separate. This engine is of ten-horse power, and produced by Messrs. Robey, of Lincoln. From the drums hung upon the hind axle, the ropes proceed through a double-snatch block, right and left, to the extreme corners of the field or space to be cultivated, the engine thus forming the apex of the triangle, whose base is formed by the implement's line of draught. Two implements were worked—the ordinary Smith's cultivator, with improved spud points; and Chandler's three-furrow balance plough, which did not show good work.

Mr. T. Dring, jun., brought into competition Mr. Smith's apparatus as it is now manufactured by Messrs. Howard, of Bedford, which presents no improvement beyond what was described at Warwick in July. The engine employed was of ten-horse power, manufactured by Messrs. Clayton and Shuttleworth, and the implement used was the five-tined cultivator fitted with broad speed points.

The third set of apparatus deserves particular notice, because, of the three, it approaches nearer to what, as practical farmers, we require. The implement, windlass, &c., are Smith's; but the engine, a locomotive, is the joint production of the exhibitor, Mr. James Walker, of Terrington, and Mr. Savage, an engineer, of Lynn. The day previous to the trial, this engine started at 2 o'clock in the afternoon, and arrived upon the field, a distance of six miles, in comfortable time to set down, carrying all that was needed with it. When the trial was over, on the following day, at about 4 o'clock it walked composedly home, and arrived soon after dusk.

All this was done without the aid of horses; the wheels being large and plain. The engine, however, only a 7-horse power, was never designed for the purpose to which it is put, and was not equal to compete comparatively, as to the amount of work done, with the better and newer engines employed by the two Mr. Drings. This engine might have been of 12-horse power without increasing its draught more than 1½ cwt., and then it might have taken the prize, possessing as it does the additional advantage of carrying a seven-hours' water supply.

The Judges would, we think, at all events have been quite justified in swerving slightly from their instructions, and founding their award less on the actual amount of work done, than on the means of doing it; for the nearer we approach a self-contained machine, and direct communication of power, the nearer we come to a solution of the difficulties that surround steam cultivation. Robey's engine, as now made, requires so many horses to lug it about, that it never can be generally used. Place it on Boydell's, or Romain's improved Boydell's wheels, and the difficulty is removed. As Mr. Walker was the only competitor who dispensed with the use of horses, or nearly so, we think at least a portion of the prize was due to him. He worked Mr. Smith's 3-tined implement with large shares; did splendid work; cut every particle of ground, and left it rough and exposed to the influence of winter. He also showed an arrangement of snatch-blocks at the extremities of the line of work, which did not necessitate the stoppage of the implement at the ends, and gave him an advantage over the others in turning, which may be represented as 3 to 1. The whole of the work done by these cultivators was extremely good, and a great inroad was made on the small amount of prejudice which yet remains in this neighbourhood against steam-cultivation.

In addition to the prize which will be offered another year by this society for the best application of steam-power, there is already offered by Mr. Smith a prize of £20 for that 100 acres of land best cultivated by any application of steam power.

CUMBERLAND FARMERS' VIEWS ON THINGS PAST AND PRESENT IN FARMING.

At the Cumberland and Westmoreland Society's Meeting, Mr. JOHN GREY, of Dilston, said, I cannot say that I am a stranger to this county, although I have not visited it for some time past. It was not my intention to obtrude upon you anything personal to myself, but old feelings and recollections have been so vividly recalled by my present visit, that I can scarcely forbear making a few remarks of a personal nature. It is now nearly fifty years since I resided in the vale of Lorton, one of the loveliest spots the sun ever shone upon, and which still remains in my recollection with all the native ardour of youth and imagination. When a boy I lived there with an old clergyman. I took the opportunity yesterday of revisiting the scenes of my youth. I found the lovely Vale there as of old, unchanged in all

its beauty; the same familiar mountains rearing their majestic heads over the peaceful lake of Buttermere, which was once the joy of my youth. I don't wish to impose upon you the sentimentalism which inspires my own breast, but that visit recalled to my mind the kind of stock and cultivation there used to be in those days, and showed how great was the contrast of the present day. I recollect that the worthy parson with whom I lodged kept a cow. It was of a type now gone out. I see none of its progeny in the present day. It was one of those respectable matronly animals, with red sides and long white streaks, with horns so adjusted that it was necessary for it to go with mathematical precision in order to enable it to get its head within the door of its byre. I remember to have seen specimens

of a breed of cattle at Mire House and Workington, whose places have since been almost entirely superseded by the usurping short-horn. Nor is it to be lamented that these relics of a former time are gone, for, though they were certainly picturesque objects in the surrounding scene, they did not possess the advantages of early feeding and quick maturity which the farmers of the present day find absolutely essential to the supply of the fast-increasing population of this country. That population, I am happy to say, are now able by their earnings to indulge in beef and mutton, which was not so much the practice at the time I have mentioned. We know that early pay is the thing now to be aimed at—a quick return for the money laid out; not to wait till they are four or five years old, but to feed them from their birth upwards, so as to bring them quickest to maturity. That, however, is a subject which I need not enlarge upon; but there is one thing peculiarly appropriate to the season which I may be permitted for a moment to advert to. My time and experience are now of considerable extent, but I never saw so great a failure in the root crop as there has been this year in all the northern counties of England and parts of Scotland. This is accounted for in various ways. Some tell you it is owing to the excessive drought of the past season; others will say it is from the extreme mildness of the winters we have had of late years, and the absence of those severe frosts and snows which destroy the insects which are so inimical to roots; but one thing I should wish to impress upon your minds in this, that wherever there has been any great exception from a failure so general, I have always found it to be in those situations where autumn cultivation has been attended to. The land has been made up in the previous autumn, on the removal of the crop, and allowed to become mellow under the winter rains and frosts; in all cases where this course has been adopted there have been abundant crops; whereas on land differently treated, however well managed and well manured during the heat of summer, turnips have not grown at all. The circumstances of the present early harvest give farmers a great opportunity for observation and experience of this description, and I am glad to find that in my neighbourhood many agriculturists are taking advantage of what they have seen, and are now making up their land into drill rows for the reception of their crop.

Mr. GIBBONS said, it was certainly a novel feature in agricultural exhibitions to see steam engines at full work reproducing the operations of the farmstead upon the field. Had anybody told us a few years since that such things would be, he would have been considered more fit to be in a lunatic asylum than to be going at large. He hoped that the improvements in this department were still in their infancy; and progress must be their motto if they wished to keep pace with the agriculture of the country.

Mr. GILLBANKS said, it had afforded him much pleasure to observe that agricultural implements were daily becoming less massive, less cumbersome and more compact, lighter and cheaper—much cheaper and more practical in every sense of the word. They might depend upon it that light, practical, and cheap machinery were the great pivot upon which all agricultural success must eventually turn. He was struck by the great number of men who came to Burgoes and Key's to purchase implements of every description. It was not the rich nobleman spending £40 upon a new implement to please a favourite tenant; it was not the enthusiastic amateur squandering his money without calculation; nor was it the man who simply spent his money

in order to astonish his neighbours, and usually concluded by astonishing them in a very different way to what they anticipated; but it was the comparatively poor but honest men—the horny-handed practical farmers, who were determined to avail themselves of these improvements. He heard of ten or fifteen of these men clubbing together for the purpose of going to Warwick to lay out their money in the purchase of some agricultural implement, worth from £50 down to 5s., for their mutual benefit and for the benefit of the locality in which they farmed. These were the men who generally prospered, and he hoped they would always continue to prosper. When he contrasted this conduct with, he would not say the laziness or the want of skill of some of the Cumberland farmers, but with the prejudice and obstinacy of some, he could not help feeling ashamed to see them still plodding on in the beaten track of the Fell-side forefathers of an age gone by. When he saw these Fell-siders running a-muck against the improvements of the age, it only reminded him of poor saddle-headed Don Quixote, the ohivalrous Knight of Cervantes, who would insist upon attacking a whole range of windmills at full sail, under the delusion that they were a regiment of soldiers, with a poor rotten old spear. We know what became of that gentleman, and they might be pretty able to guess the fate of those who rivalled his foolhardiness. He had been told that day in a jocular manner that retired tradesmen made the best farmers. Well, he thought there was a great deal of truth in that; and why? They were men who made money by laying out their capital freely and with confidence in their early career, and when they had made a fortune in trade they turned to the country and settled down as good farmers. And, I must say, continued Mr. Gillbanks, that when I see a comfortable homestead, with everything in apple-pie order, with an elegant portico and a well-swept lawn, with, in summer, a voluminous display of crinolines gliding within an avenue of trees, I put that down as belonging to your retired tradesman and incipient farmer. Nay, they really did know something about farming, and set professed hands an excellent example. But what was the career of a small holder who never stirred out of the beaten track? He had a small farm, worked like a galley slave for 40 or 50 years, eating the bread of carefulness and taking no rest, till at length, having saved some £200 or £300, he had reached the summit of his ambition, and, to use a homely and familiar Cumberland phrase, was enabled to retire and live, theoretically and practically, "upon his own bottom."

DEATH OF CATTLE FROM EATING YEW BRANCHES.—At Red House, Hursley, lately occupied by Mr. Fowle, bailiff to Sir W. Heathcote, Bart., there is a yew hedge cut to fancy shapes and figures. This operation was performed during the past week, and the cuttings, which Mr. Fowle during his occupation always had carefully collected and burnt at once, were on this occasion suffered to lie on the grass of the field. Alongside, in this field, Mr. Newton, of Ashley, had about thirty heifers to feed, and on Thursday morning some boys out picking mushrooms found eight of them lying dead at different places. A ninth was apparently in great pain, and a strong emetic given to it showed the cause of the death of the others, namely, the eating of the yew cuttings from the hedge.—Hampshire Independent.

ON DRILL HORSE-HOES.

The growing of root crops in raised ridglets of ground that were placed at the distance of twenty to thirty inches apart, very soon suggested the application of an implement with which to move and work the intervals, in order to destroy the weeds, and to pulverize the soil. This operation was further devised to cut and pare the sides of the ridglets, leaving a narrow rim, in which the young plants of turnips are placed, thus reducing the labour of the hand-hoe to less than one-half of the time which would be required without the application of such an implement. The bottom of the intervals were to be moved and wrought, and the sides of the ridglets cut, in order to kill the weeds, and pulverize the intervals of ground.

After a considerable time had elapsed of invention and trial, the long-established implement of the best use is the North-umbrian horse-hoe, drawn by one horse, consisting of a wooden beam, with two forked handles, in the length of the common plough, with a cast-iron breast, on the point of which is fitted a two-winged share of wrought iron. On the sides of the beam, at the point of mortise in the top of the cast-iron breast, there are, moveably affixed by an iron staple, a timber narrow-squared slab of two to three feet in length—the hind end of which is slipped upon a graduated iron circle, that is fixed across the under-end of the handles of the implement. This graduation regulates the width of the two arms, which are fixed in position by a screw nut. Two iron arms are fixed by wedge in the ends of the wooden bars, and reach down into the bottom of the intervals, with the under ends bent and curved inwards, to suit the edges of the drills, and the points, to meet in the intervals at the hind end of the implement. The under end of the iron arms is sharpened into a knife, which cuts the weeds below the surface, and pares the sides of the ridglets. The two-winged share in front ploughs the bottom of the intervals, and altogether there is moved the entire outer area of a half-square, with a circular end.

The arms of timber and iron being removed, a cast-iron mould-board is attached to each side of the implement, by means of an iron rod passing down through thimbles fixed in the board and in the implement. In this form the implement is used for the purpose of earthing-up potatoes, and of turnips, till now that the latter is discontinued.

On all turnip lands, of the proper designation, this implement performs the work most completely, so that no better execution can be wished or expected. In damp weather and on very weedy soils, with chickweed and spurrey, the cutting knives carry along an accumulation of weeds and earth, which must be slipped off by bending backwards the under end of the knives. Even then the work is unsightly with heaps of weeds and earth. It may be said that the work should not be done in wet weather; but on large turnip farms the urgency of operations admits no delay, as in damp, if not very wet weather, the weeds overtop the turnip plants, and much damage the crop. And the hand-hoeing of the turnips is often compelled to be done in damp weather on extensive farms.

Light iron scarifiers are contrived, with several tines or cutters, and a duck-foot share, and a harrow attached behind, which scarify the bottom of the intervals, pare the sides of the drills, and shake the weeds from the earth. The performance differs little from the work of the horse-hoe described.

Howard's prize horse hoe is of this description, and the

ridging plough fitted with cutting knives very much resembles the implement of Northumberland, with its knives and arms.

Morton's expanding horse hoe is very ingeniously contrived to be narrowed or widened in the cutting tines, on the principle of the parallel ruler, which sets the cutting face of the knives in a straight line; whereas the circular graduation widens the hind-end without the fore-end, and places the face obliquely. In dry weather, and on the proper soils, the performance is most excellent, and it pierces stiffer lands than the implements that have been mentioned. But in damp and showery weather, and among an abundance of annual weeds, as chickweed and spurrey, the close position of the several coulter carries along a large collection of earth and weeds, which very much entangles the work, and disturbs the operations. The implement is too short in the length, and the motion is in consequence rickety and wanting in steadiness, while the number of times prevent the penetration of the grain in the proper depth. It goes deeper than the other hoes, but is still deficient.

The stiff-bottomed lands and clayey loams, on which are grown the crops of potatoes, Swedish turnips, and beet root, are not penetrated by the scarifiers, as have been mentioned; the number of times or coulter throws out the implement; the surface is skimmed, but the ground is not moved. The miniature iron plough, drawn by one horse, pierces and ploughs one side of a drill with a common furrow, which is laid into the interval; in returning, the side of another drill is pierced, and another furrow joined to the first, which completes the working of the interval. The ground is pierced by the plough, and fresh soil is turned up to be wrought and pulverized. An operation of the knives will very beneficially work the two furrows that have been laid together, or the ploughing may be continued throughout the summer, in being twice or thrice repeated. The miniature plough is superior on any land to the scarifiers with several tines, as on dry lands and in dry seasons the narrow point penetrates the ground, and raises moisture for evaporation to be imbibed by the tender leaves of the young plants. The passing of twice along each interval will be objected to, as the other scarifiers do the work at once; but true economy consists not in getting work cheaply done, but in getting it well done; and in this case the superiority is very great, after all that has been spoken and written on the subject of horse hoes. Two miniature ploughs, of timber, are fixed together by two bars laid slanting over the beams, and at the distances of the width of one drill of land; two horses walk in the intervals on each side of it; the plough is drawn along, and pares a furrow from each side, and lays it in the interval, leaving a narrow rim or row, in which the plants are grown. This is a simple and most effectual implement, and finishes an interval in one passage, though requiring two horses: the labour of this additional horse-hoeing is well repaid by the superior execution of the work, with which no tined-scarifier can compete.

In the West of Scotland the cultivation of potatoes is most successfully practised on the stiff-bottomed loams of that rainy climate. The mould-board is unscrewed from the common plough, and the intervals of the potato drills are ploughed and wrought by the skeleton implement, and no better cultivation has yet been done. No scarifier could effect the purpose.

Every implement that is provided with several prongs, tines,

or coulters, which constitute so many points of resistance, will fail in competition with the plough, which forms only one point, and enjoys that immense superiority. Grabbers may much assist cultivation, but are unable to commence the work in the first movement of the land; the number of points prevents the effectual operation of any single; and the principle of moving the ground is inferior to turning it up. If an enormous steam plough can be made to drag through the ground any grabber with three or four narrow or broad-footed

coulters the ground is only moved, and not turned-up to the beneficial action of atmospheric influence, and on that account will ever be inferior to ploughing, which being done by steam power, though at less expense than by horse-labour, would hardly seem to warrant the outlay of the large cost of steam machinery. For the above reasons, that manuring the land and not turning it up is inferior to ploughing, so the scuffling of intervals of drills is inferior to piercing the ground by the miniature plough.

J. D.

SIR J. W. RAMSDEN ON AGRICULTURE.

At the meeting of the Craven Agricultural Society, held at Skipton, Yorkshire, on Friday, October 14, Sir J. W. Ramsden, on giving "Success to the Craven Agricultural Society," said:—After having had the advantage of witnessing the magnificent show this morning, and considering that it is only the fifth year during which the society has been in existence, I think we shall drink the toast, not only with hearty goodwill, but also with great confidence as to its success. But, gentlemen, great as has been its success hitherto, and good as the augury is for the future, I look with the greatest confidence to its future welfare, not so much on account of what it has done in times past, as on account of the enormous field of usefulness which lies open before it. We are accustomed to boast of this West Riding of ours that it presents an epitome of the whole life of England—that in the West Riding are represented commerce and manufactures of every branch and agriculture of every description. If this boast of ours be true, the functions we in Craven exercise may be taken as representing the pastoral state, and, as a matter of course, we occupy, as representing the pastoral state, I will not say a discreditable position, but, by necessity, we occupy a lower stage of civilisation in the community of the West Riding. There are also great advantages by which this position is accompanied. We may not have made very great improvements in some parts of the district in times past, but that leaves all the more room for improvement in the future. We have at least this advantage, that whereas other parts of the kingdom have had to work out and to buy at a heavy cost their experience in agricultural matters, we come in at a time when we may reap the benefits which science has developed. We have the labours of other people ready at our hands, and all that we have to do is to profit by them. Now, in speaking of this district of Craven, we find it divided into two separate divisions; one, that in which we are now assembled, viz., Skipton, the capital of Craven, and in this lower region perhaps there is not very great room for improvement. We see here, in the fertility of the soil, and the skill of those who cultivate it, that farming has attained to a very high place in the agriculture of England. But those, as I do myself, who come from the barbarous mountain regions, will derive the greatest benefit from the establishment of this society. We have, I fear, a rather different tale to tell. As far as we are concerned, there has been but very little or no improvement. As you go up among those mountains, you will find that our pastures are still undrained, our roads in many places hardly practicable, our hill-sides devoid of shelter, our farm buildings of a most primitive description, and, in short, that we have a great deal to learn; and I can only hope that we shall have the will to learn it. But if in these districts we are very much

behind-hand, compared with the rest of the world, in agricultural improvement, at least we have two mainstays from which our future improvement may be developed. We in Yorkshire are very much maligned by the people of the south, if we are not tolerably, if I may use the expression, "wide awake," in all that concerns our more immediate interests; and also I think that even in these barbarous regions, we are tolerably "well-to-do." There are few farm-houses, however homely the exterior, into which you enter, where the master of the house, if he has great confidence in your honesty, could not, if he were disposed to do so, point out a large bundle of bank notes hid on the top of the clock, or perhaps show you a hole in the wall where a bundle of sovereigns is concealed in the foot of an old stocking. If, then, we have these two requirements of agricultural improvement—that is to say material resources and intelligence to know how to make use of them, I think the prospect for us is not a very dim one. All we want is to have presented before us, and forced upon our notice, the great advantage which agricultural improvement brings with it. We want to see, in short, that we can drain, and plant, and improve our roads; and when all this is done, that it will pay us well. That is, after all, the long and short of the matter; and I think that is precisely the function which such a society as this is best calculated to afford. We come down from this barbarous region, and can meet our neighbours who live in the more fertile and improved district, and converse with them; they hear our antiquated prejudices, and laugh at us for them; they tell us what they have done, and we see what they have done, and they point out to us that if we choose, if we have energy and spirit to profit by their example, we may do just the same; and when we see a thousand acres of fertile land on those hills which are now lost in wet ridges, and are covered with nothing but bent and ling, and see the wonderful improvement wherever an open ditch is cut to let the water off, I think the evidence of our own senses will show us that everything is ready to our hands, and that we only want energy, spirit, and skill to make use of the advantages which we possess. I must say that in going through the exhibition to-day I was lost in amazement at the high quality, not only of the prize animals exhibited, but of the high average which has been attained. It is not only such men as Sir C. R. Tempest, who is pre-eminent in agricultural societies throughout the kingdom, but we see that the smaller owners of the land and the farmers throughout the country are seeing the advantage of improving the quality of their stock, and that they are associated to do it. Depend upon it the whole matter rests in their hands. It is not by a large-landed proprietor here and there setting an example, by laying out his money, and perhaps not considering whether it will pay

or not, but the real improvement of a district must rest in the hands of those who cultivate that district; and it is not until we are able to show them that they can cultivate it and derive a great profit by introducing improvements,

that we shall see any material advances in agriculture take place. It is just because I believe that this society is calculated to perform that function that I look forward so hopefully to its success in future years.

THE DUTIES OF OUTGOING TENANT FARMERS.

At the Monmouth September County Court, the Judge, J. Maurice Herbert, himself for some years a practical farmer to a considerable extent, delivered the subjoined judgment, in a case in which his decision had been reserved from the previous court.

DAVID HOPKINS v. MOSES LEWIS.

The plaintiff, said his Honour, was the occupier of Trebella farm, in the parish of Skarfrith, in this county, up to Candlemas, 1858; and the defendant succeeded him in the occupation. The action is brought to recover the sum of £6 8s. 6d., being the price of the seed and the labour which had been expended in sowing 15 acres of clover, and which, according to the custom of the country, an outgoing tenant is entitled to claim from his successor. It was not denied that the incoming tenant is liable to pay for the seed and labour where the outgoing tenant has treated the crop with proper care, and done everything which the rules of good husbandry require; but it was alleged that the plaintiff had either turned in his stock during the winter, or had allowed the fences to become so much out of repair as to be of no avail in keeping them out, and that in consequence the clover crop was seriously damaged, and therefore that the plaintiff was not entitled to recover. The plaintiff avers that he had taken the same care of the seeds as if he had been to continue tenant the following year; that he had some calves upon them up to the October sessions, which took place on the 19th of October; that he had a few fat sheep, from nine to eleven in number, upon them for about a fortnight after; that nothing afterwards was turned in, and that no stock was ever upon them subsequently, except that his horses broke through the hedge one night from the adjoining piece of pasture land. He admitted, however, that there was a gap in the fence between this pasture field and the outer field of clover, which was stopped by a gate being placed against it; and he also admitted that there were tracks of horses and cattle in the clover fields when possession was given up to the defendant at Candlemas. His evidence was corroborated by that of his wife, one of his servants, and a neighbouring farmer; and he called Mr. Amos Jones and Mr. Shewell Williams to prove the custom of the country. Mr. Jones thought it improper to depasture the seeds with stock after the 1st of November. Mr. Williams thought it necessary to shut up the land before that time. Upon the part of the defendant it was proved by himself, his son, and a man in his employ, that this land was covered with snow when he took possession; and that as soon as the snow went away there were tracks of horses and cattle upon the seeds quite recent; that there was a gap in the fence between the outer field and the pasture land, quite down to the ground, and another in the interval fence between the two clover fields. It was also proved by Thomas Skynner, who was working in a neighbouring quarry during the winter, and by James Edmunds, who lived within sight of the land, that sheep were upon the clover in the winter months, the last witness swearing they were there as late as in the middle of December. There was conflicting evidence as to the amount of produce when the crop was harvested, but such evidence

appears to me no farther material than as going to corroborate the direct testimony as to the way in which the plaintiff had dealt with the seeds whilst the land was in his possession. If he sowed good seed in regular course, at the proper time and in a proper manner, and afterwards treated the clover stock as a prudent farmer of competent knowledge would do, I think he would be entitled to recover whatever sum the custom would give him, although the crop ultimately failed; for having done everything which could be reasonably required of him to secure a good crop for his successor, he would have fully performed his duty towards the incoming tenant, and would be entitled to recover the customary remuneration for his services; and if the crops afterwards failed from an unfavourable season, or from any of those natural causes to which a clover crop is liable notwithstanding the best arrangement, his right to recover would not be affected. Again: if he sowed the clover out of regular course, as, for instance, on a field of autumn-sown wheat, which, according to the prevailing course of tillage, would be followed by a crop of turnips, then I apprehend the plaintiff could not recover, though the stock of clover, when the incoming tenant took possession, was as promising as possible. If, however, the crop turn out to be ultimately good, it would go to show that those rules of husbandry, which the outgoing tenant had disregarded, were not under all circumstances absolutely essential; but inasmuch as the outgoing tenant's cause of action must be complete at the time of his giving up possession, his right to recover must be determined by the state of facts at that time; that is to say, it can only be established by his showing that he has done everything which can be reasonably required of a prudent farmer with reference to that particular crop, everything which farmers of ordinary skill and judgment think it necessary to do in order to secure a good crop for their own use. Applying these views to the facts of this case, I am of opinion that it was clearly proved that the plaintiff did turn his sheep on these seeds up to a considerably later period of the year than it is prudent to turn such animals upon young clover, and that he also suffered the outer fence to get out of repair, so as to admit the horses and cattle breaking in, to a still later period of his tenancy; but this probably caused far less damage to the crop than the depasturing them with sheep during the frosts of November. And the plaintiff having so acted, I am of opinion that he cannot recover, because having failed to prove that he had done what the rules of good husbandry and common prudence required of him with reference to this particular crop, he has not satisfied the court that he has fully performed his duty to his successor, and has therefore well earned that customary remuneration which is consequent only on the full performance of that duty. I will add, though, for the reasons above given, I do not think it necessary for me to find it as a fact, that I think it proved that the crop was very inferior, except on that small portion of the land where, from the dryness of the soil, the late depasturing was less likely to be prejudicial.

Judgment for defendant. The costs of attorney and witnesses were allowed. Digitized by Google

FENCES.

There is perhaps no part of our rural economy so generally and systematically neglected as the management of fences; and yet an insufficient fence—especially on a mixed stock and tillage farm—is a fruitful source of discomfort; not an imaginary, but a real evil. Whatever may be the cause which tends to produce so great an amount of unsightly dilapidated or overgrown fences—whether on the tenant's part, insecurity of tenure, want of capital, skill, or energy—we must not stop to inquire, but proceed to consider the various fences suitable to the many extremes of soil and situation, and the mode of planting, rearing, and maintaining them in a vigorous state of health and efficiency.

The fence most general in this island is the white-thorn hedge, and, considering its permanency under suitable circumstances of soil and situation, it is the best of all our known plants when a good hedge is a desideratum. The soil most congenial to its health and longevity is a good loam with a dry subsoil, and a situation rather sheltered than otherwise. Thus situated, and with proper management, the white thorn may be grown to perfection. On soils of a light thin nature, combined as such soils generally are, with an exposed situation, it will be found growing languidly and dying prematurely. In moss, sand, or gravel, unless due attention be paid to regular cleaning and cutting, the thorn frequently dies very suddenly. In planting hedges under any of the last-named conditions, a mixture of beech with thorn is much to be recommended; as, in combination with beech on such soils, the thorn is found to grow luxuriantly, and make an excellent and lasting fence; whereas, if planted alone, consumptive health and premature death is the result too frequently attendant on the outlay. Beech is one of the most hardy of all our hard wood trees, and possessing as it does the peculiarity of retaining its foliage during the winter months, it makes the very best of fences for a high outlying situation, when shelter is necessarily of the greatest importance. It will thrive and live to a great age on the most exposed situations, provided it has light and dry soil to luxuriate in, and if attention be paid to the regular cutting over annually, it will carry leaf the year round for an indefinite length of time.

In planting a thorn or mixed thorn and beech hedge, the first essential that must be seen to is, that the intended site has a subsoil naturally dry, or that it has been made so by artificial means. The old-fashioned mode of planting on the edge of a mound, formed by digging a trench or ditch, was chiefly with the view of keeping the roots of the hedge in a dry soil, although the ditch occasionally served as a main to convey the water from the surrounding enclosures. This form of fence we consider to be by no means the best: the outlay in its formation is great, and there is also a regular annual expenditure necessary in scouring or cleaning out the ditch: it occupies much more ground, and al-

together does not present so tidy an appearance as a hedge planted on the surface, without either ditch or mound. Nevertheless, in special instances, it is the only form in which a hedge can be got, and we will give a brief outline of the method of forming and planting, as in our younger days we saw carried out by a gentleman in Northumberland, and a better manager of fences than whom we have never yet come across. The line of fence having been agreed upon, the first operation of the workman is to run his line by the edge of the intended ditch, and, taking his spade, clear off all the weeds, and level the surface to the breadth of nearly 30 inches back from his line, and along the site of fence as far as his line reaches. He next proceeds to mark off, close by his line, the edge of the ditch, and in doing this turns his face to it, and with his foot forces the spade deeply into the ground at an angle considerable enough to form slope sufficient for the side of it. This completed, he removes his line four feet to the opposite side, and with his face again to the ditch, makes his second cut parallel to the first, and, as near as he can, with the same slope or angle. He has now the exact site of the ditch set off, and goes on to remove the surface soil from it, turning the soil upside down, and laying it about six inches back from the edge of the ditch, and on the ground previously levelled for the line of hedge. This space between the edge of the ditch and the bed of the plants is provincially styled the "scarcement," and is for the purpose of supporting the bed, and preventing loose soil from rolling into the ditch. The bed must be three inches above the level on the scarcement side, and have a considerable slope backwards, so that the roots of the plants incline vertically to the ground.

The bed and scarcement being completed, due care being taken that no weed exists in either of them, the next operation is the planting. And here we would recommend having plants of a good age and strong, and before planting they should be cut with a sharp pruning-knife, so as to leave about four inches of stem on each plant; and thus prepared, the planter takes the plants in his left hand, and with his right places them on the bed previously formed, and at the distance of seven inches one from another. Another workman follows, collecting the finest of the soil from the partly-opened ditch, and covering very carefully the roots of the plants: another spading of surface soil is then put on above that, and then the whole trampled firmly down to secure the plants in their proper position, and exclude drought. The whole contents of the ditch is then thrown out, and made to form a bank above the roots, of a pyramidal form. The usual size of the ditch is about four feet at top, 18 inches at bottom, and two feet deep. The bank should be formed a little flatter in slope than the sides of the ditch, and also should be trampled firm as the work proceeds, and when com-

pleted should receive a smart beating over with the backs of the spades, which smooths and much improves the appearance. The soil should be made firm around the necks of the plants, and they should have a level and regular projection. In Northumberland hedges as described are planted and finished off at a cost of from 3s. to 4s. per chain, the severity or otherwise of the work depending upon the variety of soil; and at those prices per chain an average labourer will earn from 2s. to 2s. 6d. per day.

When the fence is completed, it should be protected by a three-barred railing, one line of railing to be set on the outside of the ditch, and another outside the bank on the other side of the hedge, and this to be kept good until the young hedge becomes itself a sufficient fence, which, with proper after-management, it will attain in from 8 to 12 years, according to the favourable nature of the soil or otherwise.

We now come to the hedge planted on the flat, without any ditch or its attendant mound; and to grow in

this form successfully it is of primary importance that the subsoil be dry: if not so naturally, resort must be made to drainage. The first operation after the line of fence has been staked out is to trench the site to a breadth of three feet and a depth of 18 inches, and during the operation of trenching care being taken to pick out all the stones and root-weeds. This should be performed in early autumn, so that the soil may receive the ameliorating influence of the frosts until the young plants are put in, which should be in the month of February. When the soil is not altogether of a favourable nature, it is to be recommended to have a few cart-loads of good loam worked into the site of the hedge as the trenching proceeds, and which will be much more likely to favour the ultimate health and well-doing of the hedge than farm-yard manure, which, though recommended by some, I should not in any circumstances apply to a young hedge.

W. J. MOSCROP.

Forest Farm, Wetherby.

RATIONAL SEEDING.

A few more words on rational seeding command a space in your intelligent agricultural columns, as the season is fast approaching for sowing wheat. Let it not be supposed that, because we have advanced but little on this subject for these last two years, our system is admitted a failure, and has become defunct. It is not so, although it has been pronounced by some as being in a deep consumption. Our conviction of its practicability is still more confirmed every year; and it is ever a pleasing duty to reintroduce the subject to our readers, believing it calculated to benefit a vast portion of our agricultural friends.

The eminent Jethro Tull of olden days, the inventor of our common drill, was celebrated for rational seeding and deep cultivation; but, owing to the want of facilities for carrying out his purposes (which, blessed be God! we all, in the present age, have the privilege of enjoying), and for want of the knowledge and aid of our modern machinery, he failed to be successful in convincing the world of its truthfulness, which very circumstance cast a gloom and mistrust over all his adventures, both then and ever since, never to have been recovered, nor considered worthy of notice by the agricultural community, till of very recent date. Tull, however, with all his eminence, appears to have lost sight of one grand, important point—viz., the distribution of the seed into the soil in *single grains*—and appears to have had no idea of the necessity of adjusting the necessary apparatus of his drill to perform this important particular work, and which requirements are wanting in it, to this very day.

In some future paragraphs (with your permission, Mr. Editor), we purpose to extract some of Tull's successful experiments, for the perusal, if not the benefit, of your agricultural readers. It is gratifying to know that many of our brother-farmers have of late year,

acceded to our remonstrances, and have sown only 1½ bushels per acre of wheat, instead of 3 bushels. The writer can well remember that, in his youthful days, 3 bushels were very commonly used; and it is still, even in this enlightened age, practised in some districts: and sometimes more than this. The most reasonable excuse our opponent-friends make for not sowing their wheat earlier and thinner than their fathers and grandfathers did, is that "their crops get so shockingly foul with weeds before winter, especially the *black grass*." All this, we admit, is feasible, and not false reasoning; and we ourselves have sometimes (though very reluctantly) been induced to follow their example, and row in the same boat, sowing as much as 2 bushels, because it should "smother the weeds;" but the time is come that we must one and all secure means to avoid this evil, in order to compete with those that do so. By perseverance and assiduity this evil may be very much, if not entirely, obviated. If wheat, winter beans, barley, oats, or peas are to be sown on fallowed land, or after early crops of beans, peas, &c., the land should be once well ploughed, and perfectly and repeatedly comminuted by Bentalling or scarifying, also by harrowing, and, lastly, by rolling, all under one operation, or at one time, not later than the end of July or beginning of August, thus obtaining a beautiful tilth, or seed-bed, or nursery, for all kinds of indigenous and spontaneous seeds to germinate in, as if it were for nursing the most tender annual flowers to be sown in our gardens. In short, every facility should *then* be brought into requisition to obtain abundance of weeds, which will then not have time to ripen their seeds, to be fed off with sheep at Michaelmas-time, or to be ploughed in as vegetable food for the wheat-plants. In fact, it is not extravagant to manure for the weeds before the summer ploughing, instead of for the wheat in autumn, as they will then be encour-

reged to germinate in more abundance, and at no loss whatever. We have a piece of land at the present time, thus cultivated after one of our early crops, so completely covered with seedling weeds of all descriptions—the progeny of many years' sowings, no doubt—that we are ashamed our brother-farmers should look upon it; but we ourselves regard it as a beautiful crop; and, anomalous as it may appear, this very piece of land, we flatter ourselves, will prove the cleanest of our wheat crops, feeling assured that no other piece would have paid us so well, and effected so good a cure or destructive for the weeds, it may be for many years to come; whereas if the land had been repeatedly ploughed at great expense till the present time, and the wheat sown now early, as it should be, most of the weeds would then have lain dormant, and not have germinated till now, with the wheat, or in the spring, and the crop must have been inevitably smothered, and attended with much labour and expense and loss; in fact, no human art could then have devised means to eradicate them from the corn, not even with considerable expense—an amount of manual toil which cannot now in these times of low prices be afforded. All must, then, “have grown together until the harvest,” as the tares (weeds?) are represented to have done in the parable of our Lord. Hence arises the chief motive farmers in general have for adhering to thick sowing, “to choke the weeds,” at the expense of not much more, very often, than half crops of corn. If turnips are to be taken as a stolen crop, as they may be with profit on fallows and stubbles, they should be sown at the time of the last operations of harrowing and rolling, whether for pot-boiling or for sheep-feeding, and hoed out timely to uniform distances, whether somewhat thick for sheep or thin for marketing. The weed crop may be left to flourish till the middle of September, or later, if they do not begin to ripen their seeds. If they should show signs of this in some of the quick-growing kinds, when the summer holds out till October, and when the land was ploughed and tilled early by fallowing, they should be at once ploughed in, with a skim coulter attached to the plough to bury the weeds more effectually, and to prevent their being sort of transplanted between the furrows, and the wheat sown immediately (if it was not first regularly sown broadcast and ploughed in, which, by-the-by, is a good plan) as singly as possible, at not more than one bushel, or at most five pecks, per acre, which is half-a-pint for each square-rod; common sense, however, dictates that even this is unnecessary; but some people will sow double that quantity! Imagine one pint (which is equal to $2\frac{1}{2}$ bushels per acre) to be sprinkled equally over one rod of ground, what folly would present itself for sowing so thick! It is, however, sometimes argued—“But we must grow weeds as well as corn, and we must sow thicker than is needful, to smother them, and do what you will, and say what you may about it, Nature has so provided it, and the Scriptural prophets have foretold that they *will* and *shall* for ever spring out of the earth.” Yes, yes! but should we not rather grow them and foster them between the times of gathering and sowing our crops, rather than

amongst our main summer crops of corn, when they are at full liberty to ripen and shed their seeds in perfection, often in many cases before the corn itself is ripe? To grow weeds with turnips, especially with those intended for sheep-feed, is no matter, but wise foresight, as they will not seed themselves then, and there is plenty of moisture in the land then, in autumn, to feed them and the turnips too, *all* to be returned to the land from whence they came in the shape of vegetable manures, either by the droppings of sheep or the decayed plants themselves.

HARDY AND SON,

Maldon, Essex, Oct. 4th.

Seed-growers, &c.

SONG OF THE HARVESTERS.

BY JOHN HODGESS.

Darkness has fled, with joyous tread

Comes in the harvest day,

And all things fair its joy to share

Are making round our way.

The king of light in garment bright

Robes grove and stream and plain,

As with glad song we haste along,

To cut the golden grain—

A cheerful band of harvesters

To cut the golden grain.

The great of earth, of kingly birth,

To fame and titles born,

With all their powers, more joy is ours

On this bright harvest morn!

While despots bind their fellow-kind,

And tyrants forge the chain,

With horny hands and well made bands

We'll bind the golden grain—

With hearts the while all free from guile,

We'll bind the golden grain.

Our boast is not of treasures bought

From blood of toiling slaves,

The crowns we spend no coffins send

To fill up paupers' graves.

We boast not halls with pictured walls,

Nor ships that plough the main;

Our pride is health, our seas of wealth

Are seas of rich ripe grain,

And all the earth must own our worth

In seas of rich ripe grain.

The gay may join around their wine,

And full libations pour,

Who sigh for fame may seek a name

On fields of crimson gore;

We ask not wine, nor will we join

In strife on gory plain,

But with kind words and scythes for swords

We'll battle with the grain—

On earth to increase sweet love and peace

We'll battle with the grain.

Then let's again another strain

Send on the breeze away,

Earth's voices sweet ring out to greet

The joyous harvest day.

The bright sun smiles through leafy wilds

And o'er the meadows green,

The whispering breeze among the trees

Displays their silvery sheen,

And on the plain the waving grain

Awaits our sickles keen.